THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

VOL. XI. No. 253—14th YEAR.] LONDON, JULY 1, 1862. [Subscription per Ann. { 15s. in Advance / 18s Credit.] DOUBLE No. Price 1s.

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Barnsley, June 24, 1862.

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Gun Metal, and all other kinds of Cocks, Stocks, Dies, and Taps, Galvanised Tubes, &c.

N.B. All Goods thoroughly Tested before sent out, and Warranted.

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From which the Water cannot be abstracted.

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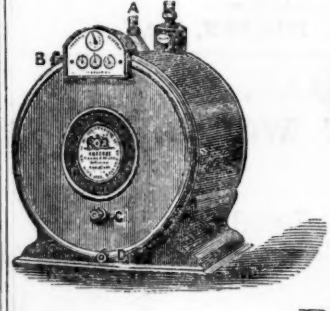

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NEW PATENT
WET GAS-METER,
AS MANUFACTURED BY
BISCHOFF, BROWN, & CO.,
Will be exhibited in Class 31 B.

An Experimental Gasholder is attached, and the advantages of the Meter illustrated with explanations.

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AND EXPERIMENTAL APPARATUS OF EVERY DESCRIPTION,
TO BE OBTAINED AT
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JOURNAL OF GAS LIGHTING ONE PENNY

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PLAIN, GALVANIZED, & ENAMELLED, for Gas, Steam, and Water, from ⅛ in. to 6 in. bore.
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ORLANDO BROTHERS,
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AND EVERY DESCRIPTION OF
TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.
FIRE-BRICKS, TILES, BLOCKS, AND CHIMNEY-TOPS.

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PATENT
SELF-ACTING GAS GOVERNOR.
This Instrument, which is designed to replace the ordinary Governor,
Operates solely by the Action of the Gas, without any Alteration of Weights, or the Assistance of any intermediate Agency or Apparatus whatever;
And it will maintain a Constantly Uniform Pressure in Gas-Distributing Mains, at any given point of their circuit.

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AND AT SIMON SQUARE, EDINBURGH;
MANUFACTURERS OF
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WROUGHT-IRON TUBES, FOR GAS, WATER, & STEAM; CAST-IRON RETORTS & PIPES;
HYDRAULIC MAINS, CONDENSERS, WASHERS, SCRUBBERS, PURIFIERS, & TANKS.
GASHOLDERS;
GOVERNORS, SLIDE-VALVES, &c.;
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Contractors for Gas-Works of any Magnitude. *Plans, Specifications, and Estimates furnished.*
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WORTLEY FIRE-BRICK AND RETORT WORKS,
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Leeds.

W. INGHAM and SONS, having for many years been extensively engaged in the Manufacture of
RETORTS AND FIRE-BRICKS FROM THE CELEBRATED WORTLEY FIRE-CLAY,
beg to call especial attention to their RETORTS, which have for many seasons proved to be unsurpassed in quality by any in the Kingdom, their FREEDOM FROM CRACKS and the ADHESION OF CARBON rendering them worthy the attention of all parties interested in the making of Gas.
The Works are of such magnitude as to ensure the prompt execution of orders to any extent.
Estimates for Setting, or Bricklayers sent when required.
GAS OVENS IN SEGMENTS OF EQUAL QUALITY.
A large stock of Fire-Bricks, Fire-Clay, Terra Cotta, and Drain-Pipes of all sizes kept in London at CHRISTIE & CO.—Wharf, 64, Bankside, Southwark, where all particulars of Prices, &c., may be obtained.
N.B.—*Export orders continue to have prompt attention.*

WILLIAM RICHARDS,

PATENT DRY AND WET GAS-METER MANUFACTURER,

CRAWFORD PASSAGE, COPPICE ROW, CLERKENWELL, LONDON.

WILLIAM RICHARDS, Sole Inventor, Co-patentee, and original Manufacturer of the Dry Meter, generally known as Croll's or Glover's, and which obtained Prize Medals at the Universal Exhibition, 1851, the New York Exhibition, 1853, and the Paris Exhibition, 1855, intimates to Gas Companies, Engineers, and the Trade generally, that he has established a Manufactory at the above address for his Dry Meters; and, in soliciting the patronage of those engaged in Gas Lighting, the Advertiser can assure them that the Instruments manufactured by him are not to be surpassed. They are capable of indicating accurately the smallest possible quantity. Their flexible material is of a superior quality, which Fifteen years experience has demonstrated to excel all others for durability; and all the metals of the working parts are incorrodible.

W. R. invites the attention of those preferring the Wet Meter to his patented improvements therein, which consist in contracting the Chambers of the Measuring-Wheel, at and near the Water-Line, thus allowing of a longer range for the Float, and avoiding the sudden extinctions so common; also a simple remedy is applied to prevent the fraudulent consumption of Gas, which the operation of the recent Sales of Gas Act has so much facilitated.

The workmanship and materials are such as to leave nothing to desire.

A TRIAL ORDER IS SOLICITED.

MANUFACTURER OF THE

TELL-TALE EXHAUST AND PRESSURE-INDICATOR;

An indispensable Instrument to the perfect working of the Exhauster.

GOVERNORS, STATION-METERS, DRY METERS FOR PUBLIC LAMPS, &c.

WILLIAM SUGG,

MANUFACTURER OF

PATENT DRY AND WATER GAS-METERS, TEST GASHOLDERS, AND APPARATUS,

"EVANS'S" PHOTOMETERS,

Experimental Meters, Minute Clocks, &c., Station Meters and Governors,

STREET-LAMP GOVERNORS AND LAVA BURNERS,

19 and 20, MARSHAM STREET, WESTMINSTER.

INTERNATIONAL EXHIBITION, 1862.

PHOTOMETERS, &c.,
Class 13,
(PHILOSOPHICAL INSTRUMENTS.)

METERS, GOVERNORS, &c.,
Class 31,
(Opposite the AMERICAN DEPARTMENT.)

WILLIAM & BENJAMIN COWAN,

PATENT WET & DRY GAS-METER MANUFACTURERS,

Buccleuch Street Works, Edinburgh, & 13, Strutt Street, Manchester.

Established 1827.

SOLE MANUFACTURERS OF

ESSON'S PATENT COMPENSATING GAS-METERS;

KAY'S PATENT HYDRAULIC VALVE GAS-METERS;

Also, DRY METERS OF THE MOST APPROVED DESCRIPTION;

All of the above being Stamped under the Provisions of the SALE OF GAS ACT.

W. and B. C. likewise supply ESSON'S PATENT COMPENSATING FOUNTAINS, and KAY'S PATENT HYDRAULIC VALVES, now so extensively used for bringing ordinary Meters within the requirements of the Act of Parliament. Gas Companies can, therefore, either attach the FOUNTAINS or VALVES to their old Meters themselves, or forward them to W. and B. C. for Alteration and Stamping.

GOVERNORS, STATION-METERS, PRESSURE-REGISTERS & GAUGES,

MINUTE-CLOCKS, PHOTOMETERS, EXPERIMENTAL METERS,

AND ALL OTHER DESCRIPTIONS OF GAS APPARATUS.

INTERNATIONAL EXHIBITION,

Class 31 (Sub-Class B), No. 6288.

THREE
MEDALS AWARDED TO
THOMAS GLOVER'S
PATENT DRY GAS-METERS.

LORD REDESDALE'S "SALE OF GAS ACT."

DRY METERS *VERSUS* WET METERS.

LONDON, February 25, 1861.

THOMAS GLOVER begs to call the attention of Gas Companies and others to a few *facts*, which, if duly considered, must lead to most important conclusions :—

1. That since THOMAS GLOVER commenced to manufacture his Patent Dry Gas-Meters (which is now upwards of 15 years), every Wet Meter Maker of any importance in England has been compelled to manufacture Dry Gas-Meters; and in the JOURNAL OF GAS LIGHTING, of date of 12th of February, 1861, Messrs. William Parkinson and Co., successors to the late Samuel Crossley, advertise that they "intend manufacturing *Dry* as well as" Wet Meters, and it is worthy of particular notice that they intend to do so "after 40 years experience in manufacturing Wet Gas-Meters of such a quality that has enabled them, as they say, to maintain a superiority over all other; and this, be it also particularly noticed, after they had advertised in the JOURNAL OF GAS LIGHTING, January 29, 1861, "their improved low-spouted Gas-Meter with new patent float arrangement, which entirely overcomes the difficulty experienced by ordinary Wet Meter."

2. That it is quite consistent with THOMAS GLOVER'S knowledge that Wet Gas-Meters, called "low-spouted" or "compensating Wet Meters," have already been proved to be incapable of continuous working or registration, and for this reason the manufacturers of these Meters have been induced to seek the repeal of Lord Redesdale's (righteous) Sale of Gas Act.

3. That every year the Patent Dry Gas-Meter manufactured by THOMAS GLOVER has risen in favour with Gas Companies and Gas Consumers, placing him in the proud position of being the largest manufacturer of Gas-Meters in the country.

THOMAS GLOVER guarantees his Patent Dry Gas-Meters to meet all the requirements of the "Sale of Gas Act," to give accurate and unvarying registration with steady lights; and, from their peculiar construction, cannot be tampered with, and may be fixed in open situations even above or below the level of the lights. They work with less pressure than Wet Meters, and are not affected by the most severe frost.

THOMAS GLOVER guarantees to uphold all Meters sold by him for 5 years free of expense to the purchaser, or for a trifling per centage per annum will contract with any Gas Company to uphold their Meters of his manufacture for a series of years; and, at the conclusion of such contract, to leave the Meters all in perfect working order.

N. B.—Agents in several parts of England are wanted. Apply by letter, or personally.

WILLIAM PARKINSON AND CO.

(SUCCESSORS TO SAMUEL CROSLEY),

PATENT WET AND DRY GAS-METER MANUFACTURERS, &c.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

Established 1816.

PATENT IMPROVED WET METER.

W. P. and Co. invite especial attention to this Meter, which entirely overcomes the difficulty to which ordinary Wet Meters are subjected, owing to the short range of the Float, which is necessary, in order to meet the requirements of the Sale of Gas Act.

"It is well known that in Meters constructed so that the valve will close when the water is drawn off to such a point as to render them 3 per cent. slow the lights are liable to be extinguished by the closing of the valve by a sudden increase of pressure. To meet this difficulty, Mr. Pinchbeck has invented an ingenious and simple arrangement by which the action is reversed, and any such increase of pressure, in his Meter, raises the value instead of depressing it. The fact of the improvement having been adopted by Messrs. W. Parkinson and Co. is a sufficient guarantee that it practically and effectually remedies the inconvenience it is designed to meet."—JOURNAL OF GAS LIGHTING.

PATENT IMPROVED DRY METER,

Which W. P. and Co. pledge themselves to manufacture with the same quality of materials and workmanship as in their Wet Meter, thereby giving Gas Companies and others the advantage of procuring a first-rate Dry as well as a Wet Meter, which, hitherto, they have been unable to do.

STATION-METERS AND GOVERNORS,

Which can be seen at all the London Gas-Works. Also Liverpool, Manchester, Sheffield, Nottingham, Belfast, Glasgow, Birmingham, Dublin, Bristol, Leeds, Leicester, Brighton, Southampton, Sunderland, Wolverhampton, Bradford, Norwich, &c., &c.

TEST GASHOLDERS, EXPERIMENTAL METERS, EXHAUSTER REGULATORS,

MINUTE CLOCKS, PRESSURE GAUGES, PHOTOMETERS, PRESSURE REGISTERS, &c.

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NOTICES.

The subscription is 15s. per annum, if paid in advance during the month of January, or 18s. credit, in two sums of 9s. each, in July and January of each year. Post-Office orders must be made payable at the Charing-Cross Money-Order Office, to William H. Bennett, No. 42, Parliament Street, Westminster.

The next number will be published on Tuesday, July 15, and the subsequent numbers on each successive alternate Tuesday.

Stamped copies, when forwarded by post, must be folded so as to expose the stamp; they are otherwise liable to the full postage charge for letters.

This JOURNAL has been duly registered at the General Post Office for transmission abroad.

All Communications to be addressed to the Editor, No. 42, Parliament Street, Westminster; and orders for Advertisements to the Publisher, Mr. W. B. King, No. 11, Bolt Court, Fleet Street.

THE JOURNAL OF GAS LIGHTING,
WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 1, 1862.

Notes upon Passing Events.

WE wait with curiosity and some fear for the end of the Thames Embankment Bill. The greatest metropolitan improvement of our time has fallen into the hands of a singularly feeble committee. Every private interest likely to be benefited by the embankment has appeared as a claimant for compensation, and had its claims allowed, for the committee appear to have been tender to every one except the public. The Dukes of Northumberland and Norfolk, and the Marquis of Exeter, encouraged by the success of the Duke of Buccleuch, have each asked to be paid in meal or malt for the improvement of their property, and the committee has politely consented. Northumberland House, if it is to continue the town residence of the titular representatives of the Percies, will be not damaged, but improved by the conversion of mud into solid land. The loss of rent from the abolition of the wharves can easily be calculated. But there is something outrageously impudent in the demands made on the strength of the presumed deterioration of such streets as Cecil Street and Norfolk Street. It is notorious that for years past all the residential property between the Strand and the Thames has been deteriorating—converted from gentlemen's houses into second and third-class lodgings. A block of new houses in the best street of the lot—Norfolk Street—remained unfinished for several years. A Thames embankment, with communications to the Strand, would improve them by at least twenty-five per cent. The *Times*, which has adopted and ably enforced the view of the case of the Duke of Buccleuch which we were the first to propound, has also shown that it is even more of a job than we supposed. It seems, by the concurrent testimony of Mr. Disraeli and Mr. Gladstone, that the lease of the site of new Montagu House was only renewed through the dexterous trickery of some understrapper in the Treasury, contrary to the opinion of the two Chancellors of the Exchequer. Thus, if justice had been done, and the proper authorities had been wide awake, the duke's lease would either not have been renewed at all, or would have contained clauses which would have effectually barred him from claiming compensation. If the Thames Embankment Bill becomes an Act in its present shape, the crossing at the foot of Westminster Bridge, which old George Stephenson called "one of the most dangerous level crossings in England," will be rendered more dangerous than ever by the increased tide across the widened bridge; while, at Whitehall Place, a new and troublesome, if not dangerous, block will be created at the seasons and hours when Parliament Street is thronged with carriages. We do hope that another session will see this roadway question re-opened before a committee not quite so closely connected with the riverside residents of Whitehall Gardens.

Pending the inquiries of the sewage commission, Dr. Voelcker, Professor of Chemistry at the Agricultural College, Cirencester,* has read a paper before the Royal Agricultural Society, which contains the most complete view of the question, in words that every one can understand, that has yet appeared. This essay has the more value, because it comes from a man who has always tested scientific theories by practical investigations—well knowing that experiments which may be successful in the laboratory or the garden, are not always profitable in the field. When Dr. Voelcker arrived in this country, many years ago, well stored with all the chemical learning that Professor Liebig could impart, his first step was to place himself, as it were, at school with first-class farmers. In this way, he deserved and earned the confidence of the farmers of the western district, in which he resides—a confidence very advantageous to the cause of science. After the cloud of nonsense emitted by Dr. Brady's witnesses of the Mechian and Chadwickian school, it is quite refreshing to meet with such useful information as is contained in the following extracts:—

Taking the fertilizing property in the London sewage at the estimate of 90 grains of solid matter per imperial gallon, though that was a high average, the sewage of London would be worth £3796 per diem, or £1,385,540 per annum. He, however, drew attention to the fact that the calculation of the value of sewage was always made by a comparison with Peruvian guano, which was taken at £11 per ton. If the amount of water present in sewage were left out of consideration altogether, it was hardly fair to compare the dry matter of sewage, of which one-third only was valuable—the other two-thirds being worthless for fertilizing purposes—with a material like guano, which contained scarcely any worthless matter at all. Considerable reduction ought to be made for the useless matter in sewage, and that point had been entirely overlooked in making calculations of the value of town sewage. In the calculation above given, the value of the ammonia was calculated at £56 per ton, phosphate of lime at £7 per ton, and potash at £31 per ton. In sewage, six-sevenths of the valuable matter existed in solution, and only one-seventh in a suspended state; 100 tons of sewage, according to Hofmann, contained 15s. 4½d. worth in solution, and 2s. 2½d. worth in the shape of suspended matter, and, according to the same chemist, the total solid matter, when entirely separated from the water, would have a money value of £6. 0s. 3d. per ton, taking guano at £11 per ton. Assuming that average to be correct, a ton of the solid matter of London sewage was worth, for its

* It is rumoured that Dr. Voelcker, with several other professors, have resigned, in consequence of the determination of the new principal to convert the college into a theological establishment, managed on conventual principles. This, if true, will have the good effect of transplanting Dr. Voelcker to his proper sphere, London.

ammonia, £4. 1s. 6d., at 6d. per lb.; for its potash 17s., at 3d. per lb.; and for its phosphoric acid 3s. 2d., at 2d. per lb. By this calculation, a ton of London sewage for its fertilizing properties would be worth 1¾d., or not quite 8d. per 1000 gallons. It would, however, be very fallacious to draw the conclusion that because the fertilizing materials in a ton of sewage were worth that amount, its value as a manure to the farmer must be estimated at that price in the same way as guano was when sold at £11 a ton. They must consider the bulk in each case, and the worthless matter in sewage. In guano, they had a portable and highly condensed manure, which they could apply when wanted, and which enabled them to manure a small portion of the soil only, and thus to provide abundance of available food for plants at an early stage of their growth, when such food was most required. But 3 or 4 cwt. of guano or superphosphate per acre, if mixed intimately with 18 inches of soil, supposing that were possible, would not much benefit our root-crops. It was in the earliest stages of their growth that plants were most benefited by readily available food; for, when once the roots with their numerous fibres were fairly established in the soil, the apparatus for taking in food on all sides was formed, and the amount of valuable plant food existing in the soil was amply sufficient, when once the plants were firmly imbedded, to promote their luxuriant growth. They could not, taking the whole bulk of the soil into consideration, alter its composition by any amount of manure, nor could they, chemically speaking, deteriorate land by the most exhaustive crops. In order to provide abundance of food in the early stage of the growth of the plant, they must have the fertilizers completely under control, and be able to apply them when and where they were required. With condensed manures they could do that, and also in a minor degree with farm-yard manure, but they could only do it much more remotely with sewage. It was not because 3 cwt. or 4 cwt. of superphosphate or guano contained more fertilizing elements than 15 or 20 tons of farm-yard manure, that they obtained better results from it, but because, in point of fact, it was applied in a manner which went directly to increase the growth of the plant, whereas the more bulky farm-yard manure was applied to a large portion of the soil which did not require it. On sandy or hungry soils, where the whole of the plant food had to be supplied, bulky manure, such as town sewage, could bevery advantageously applied for the general enrichment of the soil. In reference to the application of town sewage, Professor Voelcker said the general conclusion at which he had arrived, was, that although it might be very desirable for grass-crops, it was next to useless for arable land or green crops, or even for market gardens. The value of sewage could only be ascertained experimentally on the field. Present experience went to show that, according to the soil and other conditions, the town sewage of Edinburgh, which is rather more condensed than that of London, was worth only from ½d. to 1½d. per ton. In applying sewage, it was better to allow the deposit of suspended matters, and use only the clear liquid. As he had said, the only crops to which they could apply sewage to advantage were grass-crops, and then it must be applied in great quantities and at the particular time when it was required. It should be applied, if possible, by gravitation and open irrigation, for no soil had the power of laying up in its body the greater part of the soluble fertilizing constituents. On poor sandy soils, the excrementitious matters of sewage were of great utility; but, in reference to good clay soils, water was the most valuable portion of the sewage, the fertilizing matters being in that case of little or no importance—in fact, hardly worth calculating; whereas, on light, poor sandy soils, the value of sewage rose or sank with the amount of fertilizing matter applied to the land. So far from sewage being a great fertilizer of vegetable gardens, it certainly would not pay for the machinery and pipes necessary to bring it even from a short distance, and spread it on the ground. Anything that was grown very quickly, was inferior in quality to the same kind of thing which was grown more slowly. Quickly-grown grass, for instance, was far more crude than that which was grown slowly—extreme rapidity of growth being always attended by inferiority of quality; but, of course, it was quite another thing whether it was not more profitable to producers to have the large increase in quantity, although it was attended by some degree of inferiority.

The force of public opinion has, we are glad to see, compelled Mr. Wellington Vallance's committee to reconsider their verdict as to new Blackfriars Bridge, so hastily arrived at. The three-arch design has been finally rejected. Five engineers have been asked, and have sent in new designs for a five-arch bridge, and these are under consideration. It will always be to be regretted that the London corporation did not earlier decide on rebuilding Blackfriars Bridge—then, there would have been no difficulty in so planning the metropolitan end of the London, Dover, and Chatham line as to combine a passenger and a railway bridge; now, it seems settled that we shall have the absurdity, and the obstruction, of two bridges within 150 feet of each other.

Mr. Edward Wilson, of the *Melbourne Argus*, has recently in a long letter to a daily contemporary, on the success of acclimitization in Australia, mentioned two facts that promise new sources of wealth to those fortunate self-supporting colonies. It will be remembered that Mr. Ledger after years of toil, at the sacrifice of all his means, succeeded in smuggling a large flock of alpacas out of the Republic of Peru, where export was strictly prohibited, and conveying them to New South Wales. There they have flourished and increased in a manner which proves conclusively that the herbage and climate are congenial to them. In the New South Wales Court of the International Exhibition, unfortunately where they can scarcely be seen, shaded as they are by unmeaning bales of wool, is a case of specimens of all the varieties of Mr. Ledger's flocks, admirably stuffed and arranged. Australia found its first source of wealth, and the foundation of prosperous colonization, in imported sheep and cattle, having no indigenous animals of any value for farm purposes, and hardly any for game. Now, it seems, that the alpaca, and the llama also, from which Mr. Ledger has produced an excellent cross, will supply a new export invaluable to our Yorkshire manufacturers. By recent advices, it seems that since Mr. Ledger's operation, which was so great a success to every one interested, except himself, the Peruvian Government, despairing of keeping up its prohibitive system, has given permission for the export of a flock of 1500 alpacas, which will be shortly landed in Melbourne. Thus, in a very brief space, Australia will be enriched by flocks of an animal which eats what sheep refuse—turning to profitable account vast tracts at present useless, if not barren. Mr. Wilson announces other good news. Australia, when the coast range is passed, may be said to consist of tracts of pasture, or more rarely arable land, divided by deserts, where water is scarce at uncertain seasons, and often absolutely wanting. The want of water and proper food for bullocks has been the great difficulty of explorers and their successors; the cattle and flockowners requiring supplies from the seaports in their oases of green pasture. The camel has been imported, and found suitable to Australia. Its powers of travelling on coarse food, and with water at rare intervals, are well known. That the climate of Northern Australia suits it, is proved by the fact that two or three which escaped from exploring expeditions have bred and increased with a small wild herd in the neighbourhood of Twofold Bay. This is, we believe, one of the very few instances of camels thriving in a wild state. In a few years, we may expect to find the camel and dromedary in common use for carrying stores and letters to the interior over districts at present impassable in the dry season. By the same means, a regular communication may be kept up between New South Wales and the colonies likely to be formed on the Gulf of Carpentaria, and thence with India and the islands of the India seas. We have always considered the Acclimatization Society of London as an amusement for country gentlemen, under the useful guidance of two or three enthusiastic naturalists. But, in Australia and New Zealand there is a real field open for the introduction of a number of useful and beautiful quadrupeds, birds, and fishes, from the temperate and the tropical zones. The ox, the horse, the sheep, and the hog, have already been established, with all the European domestic poultry; it remains to be seen how many more animals the hotter regions can contribute to the commerce and luxury of our antipodean colonists.

M. Barral continues his notes on the International Exhibition in the *Presse Scientifique*. They are valuable, because they are the *not* flattering impressions of a highly-educated gentleman and journalist of established reputation, familiar with England from frequent visits, although but imperfectly acquainted with our language. After all the butter that has been lavished on the arrangements of the commissioners by certain high and mighty English writers, it is almost refreshing to meet with this mild dose of pure, refined, French vinegar. M. Barral begins by saying, very truly, the "Kensington building, notwithstanding the rich variety of its contents, does not deserve the name of a palace—it is simply a monster bazaar." After giving the prices of the season tickets, he alludes to the manner in which the commissioners have taxed every possible want in the building, giving, as a characteristic example of British customs, that extremely comic department in the inquiry office, where you are asked not only to pay a penny for entering the den and studying the directories, but to pay another penny for obtaining an answer to a question—whether it is a penny for every question and answer does not clearly appear on the notice. M. Barral is next surprised that the Exhibition season-ticket does not include admission to the adjoining Horticultural Gardens. Of course, it must be difficult for a foreigner, accustomed to have the cost of all such undertakings defrayed by the State, to understand that the Horticultural Gardens are the private property of shareholders, who have no more to do with the Exhibition than M. Barral. The catalogues next come under review. M. Barral says: "First, there is the shilling catalogue. That does not include the collections of fine arts, and the foreign departments are incomplete. . . . To do the thing completely, at least two pounds must be expended, and a large library (which would need a wheelbarrow to carry away if purchased). . . . The commissioners seem to be gentlemen up to every move for getting money out of the pockets of the visitors. . . . Every foreign nation has its own catalogue, price one shilling, and every visitor should at least purchase the catalogues of France, Austria, the Zollverein, and Belgium. Three English catalogues, of an expensive character, have the defect of being almost exclusively devoted to the English department. . . . There are other publications which it is more difficult to obtain, prepared by certain countries, as for

instance, the English colonies by Portugal, the French colonies, and Algeria, and Portugal. . . . Unfortunately, the shopkeeping spirit has permeated most of the catalogues. In 1851, and 1855, England set the example of binding up advertisements with the official catalogues. France resisted this innovation up to the present time. But, now at the end of the extremely brief descriptions of the French official catalogue, there are paragraphs of what is called information by the editor. These are nothing more nor less than advertisements paid for by the exhibitors at the rate of 500 francs per page. The Belgian authorities charge 125 francs for anything not exceeding ten lines, and 12½ francs for every line over; 750 francs for half a page, and 1250 for a whole page. Belgium, also, promises an illustrated catalogue, in which every exhibitor must pay for a description of the articles he exhibits at a high-fixed tariff. . . . Thus we have Government turning advertising agents. What truth can we expect at so much a line? . . . For my part, I prefer the advertisements packed at the end of the English official catalogue, where you find the names of hotels, and tradesmen, and a list of the curiosities and amusements to be seen. . . . The visitor must take notice that, although the Exhibition contains a vast number of articles worthy of the highest admiration, the managers have taken special pains to place the productions of England in the first rank, and in the most advantageous point of view. Other nations are placed in the second or third rank. England began by appropriating six-tenths of the space, and giving up four-tenths to the rest of the world. Out of about twenty-five acres, France had the largest share of any foreign nation, and that only amounted to about three acres. In consequence, the French Imperial Commission was obliged to absolutely reject nearly half the claims for space, and to narrow the limits of others to truly Lilliputian dimensions. The total number of exhibitors amounts to over 27,000, of which 8700 are English, and 5400 French. Thus, in the matter of space, Great Britain has boldly taken the lion's share. . . . The international jury for deciding on the articles deserving prizes is composed of 569 members, divided into 68 committees and sub-committees. France alone has the honour of being represented in each committee by one juror; there are in each a majority of Englishmen. Thus, there are 310 jurors for England and her colonies; 65 for France; 38 for the Zollverein; 31 for the kingdom of Italy; 21 for Belgium; 11 for Russia; 11 for Sweden, Norway, and Denmark; 9 for Turkey, but 8 of these are subjects of the British Queen; 8 for Portugal and Spain; 7 for Switzerland; 5 for the United States; 5 for Greece; 4 for the Ionian Islands; 3 for the South American Republic; and 1 for Brazil. Only one-third of the exhibitors are English; but two-thirds of the jurors are Englishmen; while France, with a fifth share of exhibitors, has only one-tenth of the jurors. On the other hand, with the evident view of proportionately diminishing the number of medals to be awarded to the nation with the most numerous exhibitors, the United States have 5 jurors for 65 exhibitors; and Belgium, 21 for 863. It is plain that England has determined to secure an overwhelming revenge for the results of 1851 and 1855. She has said, 'I am determined to be first; and, if France is second, there shall be a long distance between us.' Will this plot succeed? Will England conquer in this unequal strife? Yes—in daring speculation, in quantity of produce, in numbers; not for intrinsic value, for quality, or for good taste. If the absence of certain French manufacturers—an absence which amounts to high treason—should cause the balance to incline to the side of England in certain branches of manufactures, the genius of invention, the art of arrangement, the finish of execution, will leave France in the position that previous Exhibitions have placed her. But France must not slumber on her arms, for England is every day pressing forward with giant strides, never allowing any failures to check the 'course of her ambition.' If, in the preceding details, British selfishness stands out in prominent relief, it must, nevertheless, be admitted," says M. Barral, "that, taken individually, Englishmen show no prejudice against foreigners—the discussions of the juries are conducted with the greatest courtesy, and even consideration, as regards foreigners. The medals are fairly awarded, but, as they are all of the same value—as the English exhibitors are by far the most numerous, and, in many instances, exhibit the most valuable manufactures—the result desired by the nation will be obtained, without any individual British juror having to reproach his conscience with a fraudulent verdict. Another point must be mentioned. In order to avoid any remark or conclusion disagreeable to British ears, the English commission has decided that the international jury shall make no report, but only prepare a list of medals and honourable mentions, with the briefest possible statement of the reason for each award. The English commissioners propose to have reports made from notes supplied by the jury, by persons specially appointed for the purpose. This proposition, it must be admitted, has been generally protested against, by even the British jurors. What will be gained by this? Will the truth be concealed? All the foreign commissioners—France at their head—will make separate reports to their Governments. These reports will be immediately published, and will constitute documents which will utterly outweight the notes of the international jury, '*cooked*' to suit English taste, by a secret and irresponsible commission."

We shall not—at present, at any rate—make any remarks on these complaints and protests of a gentleman generally supposed to be friendly to England, except that the promises of peace and good will to be promoted by the International Exhibition, do not, judging from the French press of every grade, seem likely to be realized. There is only one consolatory suggestion to be found in the *Presse Scientifique*. It seems that the English chemists gave an international banquet, at Greenwich, to the foreign chemical jurors—at which M. Barral was present—where thirty kinds of fish, washed down with every kind of wine, prepared the way for speeches in four languages. An attack of bile was the natural consequence of such a dinner; and, when a Frenchman is bilious, and an author, the phantom of perfidious Albion generally rises before him, and inspires his pen with speculation as ingenious as gloomy.

Circular to Gas Companies.

We congratulate the public, generally, as well as those of our readers who are specially interested in the supply of gas, on the rejection by the House of Commons of all those clauses of the Police and Improvement (Scotland) Bill, by which it was sought to give power to police commissioners to become purchasers or lessees of gas-works, and to manufacture gas-fittings, meters, pipes, and every other article connected with the supply of gas, by means of rates levied on the public. In our two preceding numbers we stated, generally, the objections to these clauses which were added to the Bill after its introduction into the House, and a series of "Reasons" against them were also printed and circulated among the members of Parliament by the opponents of the measure, which have no doubt contributed to defeat those portions of the Bill. Though the clauses have thus for the time been rejected, it may be desirable, now that the subject is fresh in the memory, to point out the principal objections adduced in those "Reasons" to the grant of such powers to public authorities; for it is a favourite crotchet with many, that it is to the advantage of the public to be so supplied with gas, and the proposition may be ere long revived in some other form. In the first place, it is observed, as a general reason against the principle of such a measure, that the supply of gas by municipal authorities is different from the supply of water; because water-works when once established require little further skill in their management, whereas the manufacture of gas is an art requiring great practical skill and experience as well as commercial aptitude; therefore, according to sound principle, it should be left to private enterprise and competition. Having thus shown that the power sought to be given is objectionable on public grounds, the "Reasons" proceed to point out special objections to the manner in which it was proposed to confer that power. Though the purchase or lease of gas-works professed to be merely permissive, it is shown that, by the wording of the clauses 230, 231, and 241, the *resolution* of the commissioners to purchase would, in effect, have given them the compulsory power of acquisition, which would be alike unprecedented and unjust in respect to private property not absolutely required for public use. It is shown that, as regards the supply of gas for public lamps, which is the only purpose with which the commissioners of police have any legitimate concern, the interests of the public are already provided for by clause 129 of the Bill. But, assuming that the clauses objected to were intended to authorize only voluntary purchase, it is shown that the power, though thus restricted, would have enabled municipal authorities, by the mere threat to encourage and give facilities to new companies, to depreciate

the value of existing works with the view of acquiring them at a diminished price. It is further shown that, in the event of of the commissioners purchasing the undertaking of a gas company, the mains of which extended beyond their burgh, the injustice might be done of charging a high price in those outlying districts, for the purpose of supplying more cheaply the gas consumers whom the commissioners represented. A practical difficulty would also have arisen in the purchase of the works in districts where the mains of adjacent companies interlace. After noticing these and other special objections to the clauses of the Bill, the "Reasons" against them conclude by adverting to the power of levying a special assessment for gas purposes on all lands and premises within the burgh as highly objectionable on public grounds, as it would have authorized the imposition of an additional rate on all occupiers, whether they used gas or not; and the amount of the proposed assessment of 9d. in the pound on the gross rental, is represented to be enormous, and without the power of abatement. Sir John Ogilvy, the member for Dundee, gave notice of several amendments for the purpose of removing the special objections urged against the clauses added to the Bill; but they did not affect the main principles on which those objections were founded, and the opposition to the gas clauses was, consequently, not relaxed. The question came before the House on Tuesday last, and the debate that ensued is briefly reported in another column. The Lord Advocate proposed to withdraw the clauses objected to; but Sir John Ogilvy persisted in moving his amendments, backed by Mr. Buchanan, the member for Glasgow, who adduced Manchester as an example of the advantage derived from placing the supply of gas in the hands of the corporation, as compared with Liverpool. This unfortunate comparison of the gas supply of those towns afforded Mr. Craufurd an excellent opportunity of exposing the fallacy of the Manchester system, of which he availed himself with good effect; and the feeling of the House was so strong against the proposition to empower municipal bodies to manufacture and supply gas, that only two or three feeble "ayes" were heard in favour of Sir John Ogilvy's amendment; and the outburst of "noes" was so decisive that Sir John failed to obtain a second teller in a House of upwards of 100 members; so that his amendment was rejected without a division; and the Lord Advocate's motion to withdraw the obnoxious clauses was then adopted.

At this period of the parliamentary session, every public Bill that is introduced requires to be vigilantly watched, because they often contain clauses very prejudicial to private interests, which it is hoped by the promoters may be smuggled through before attention is drawn to them. The Companies, &c., Bill, the Coal-Mines Bill, the Tramways Bill, and the Petroleum Bill, are of this character. The first one, if passed, would produce radical changes in the law affecting joint-stock companies; one of the most important of which is, that it would enable a creditor of any company, consisting of more than seven members, whether incorporated by special Act or not, to whom the sum of £50 or upwards was due, and whose debt had remained unpaid for three weeks after it had been demanded, to obtain a winding-up order, and put an end to the company. This is obviously the effect of the 198th clause, and any company, however substantial, might thus be dissolved by the action of a single perverse or malicious creditor. A Bill so manifestly unjust in its provisions has, nevertheless, met with no opposition in the House of Commons, through which it has passed; and, if steps be not forthwith taken to amend the Bill in the House of Lords, it will, in a few days, be passed in its present state, and receive the Royal Assent. Railway companies, and gas and water companies, come within its provisions, and they should exert themselves strenuously either to amend the clauses of the Bill or to obtain exemption from its operation.

The Coal-Mines Bill has been introduced by the Government, in consequence of the consternation produced by the fearful loss of life in the Hartley Colliery, owing to the miners having been buried alive from the want of egress by a second shaft. The Bill has been founded on the reports of the inspectors of mines in different districts in England, Wales, and Scotland, all of whom concur in the propriety of having two shafts, separated by natural strata, to every underground working; but doubts are thrown, in some instances, on the practicability of sinking a second shaft when the mines are deep; and the coal is now gained only with great labour and cost. In such cases, it is observed that the effect of a stringent regulation, enforcing the sinking of a second shaft, would be to close up the mines, and to throw a large number of miners out of work. It appears, from the reports of the inspectors, that a very small proportion of the coal-mines in England and Wales are without a second means of egress from the workings, but, in Scotland, the number of mines with a single shaft exceeds those that have two inlets, and the same seam of coal often belongs to several proprietors, who work it by means of a single shaft, by obtaining the right of way through the workings. The provisions of the Coal-Mines Bill, which would render it compulsory to have at least two shafts or outlets to every seam of coal, would, therefore, operate very prejudicially on the interests of the coal proprietors in Scotland. It is provided, in the amended Bill, that the owners of existing mines may appeal, by arbitration, against the prohibition to work with single shafts in special cases; but, where the practice is so general as in Scotland, few special cases could be adduced to exempt the proprietors from incurring the expense of sinking a second shaft; and the effect would be, to enhance the value of the coal. It is a curious fact, for which no explanation is given in the reports of the inspectors of mines, that in those collieries which are worked with a single shaft, fewer accidents have occurred in such shafts than in those of mines that have two means of egress. This circumstance deserves further inquiry, and should make the Government hesitate to press forward a measure the effect of which can scarcely fail to be the increase of the price of coals. We do not object to legislation for the protection of the lives of the workers in collieries, but we deprecate hasty and ill-considered measures affecting an important branch of industry, in endeavouring to provide against the recurrence of an extraordinary accident—for it is much more difficult to amend a bad measure than to pass it.

The Tramways Bill, which has been introduced by Mr. Ayrton and Sir Lawrence Palk, is to authorize local authorities to construct tramways in any roads or streets in England. Though there are several clauses in the Bill ostensibly protecting the interests of gas and water companies, there is no provision to prevent tramways being laid over a line of pipes, so as to prevent ready access to them. The 15th clause, indeed, provides that, in the construction of such tramways, there shall be no *displacement* of or interference with, the mains or pipes, without the consent of the parties having the management of such works; and, in clause 42, it is provided that nothing in the Act shall affect the rights "vested in any gas-water, telegraph, or railway company, whose mains, pipes, wires, tunnels, apparatus, or works, are in or under any road in which a tramway is made under this Act; but the power is, nevertheless, given, by clause 44, to the Queen in council, to suspend or alter any local Act, so as to remove any difficulty that may arise in the execution of the Act, and by the exercise of this extraordinary power the conditions on which gas and water companies have invested their capital might be disturbed. The select committee to whom the Bill has been referred sit with closed doors, and refuse to admit the opponents of the Bill, or their agents. Petitions against the measure are consequently being presented to the House of Commons; and the following one, from the Bristol United Gas Company, appears to comprise the chief points on which the opposition of gas and water companies is founded:—

TRAMWAYS BILL.

PETITION AGAINST.

To the Honourable the Commons of the United Kingdom of Great Britain and Ireland, in Parliament assembled,

THE HUMBLE PETITION of the Bristol United Gas Company, under their common seal,

Sheweth,—That a Bill is pending in your Honourable House, "To authorize the construction of Tramways on Turnpike Roads, and other Roads in England."

That by the said Bill power is given to any persons or bodies having the control of highways, and to railway companies, to lay down and maintain, subject to certain preliminary proceedings, a tramway over any road, according as that word is defined in the second clause of the said Bill.

That although, by the 15th clause of the said Bill, it is provided that there be no removal or displacement of or interference with any mains, pipes, syphon-plugs, tubes, or other works, placed in or under any road, unless with the consent of the parties having control of such work, and then only under the superintendence of the authorities; and provision is also made that the promoters shall compensate for any damage done by any such removal, displacement, or interference, yet your petitioners humbly allege that no sufficient provision is made in the Bill to insure access at all times, by gas companies and water companies, to the pipes and other works which may be underneath the tramway to be constructed by virtue of the Bill.

That both gas companies and water companies are subject to severe penalties, directly by enactments, and indirectly because of contracts entered into by them, if the supply of water or of gas is intercepted; and it is essential, not only for the sake of companies themselves, but for public

convenience and safety, that no power should be given for constructing works on the surface of any road or street which may involve an interruption of such supply, or may prevent any easy access to their works underground, whether for the purpose of repair, of renewal, or of alteration.

That the 19th clause of the said Bill imposes on gas and water companies restrictions and liabilities to which they ought not to be liable, and does not sufficiently maintain those rights and powers which have been conferred on gas companies, not only for their own protection, but for the convenience of the public.

That by the 44th clause of the said Bill power is given to the Queen, by order in council, to suspend or alter for a year (subject to the condition in the said clause contained) all or any of the provisions of any local Act of Parliament which may create difficulties in the execution of the powers contained in the said Bill, and to establish the provisions in the stead of those so altered or suspended. Your petitioners humbly allege that powers ought not to be given to the Executive Government of so large and indefinite a kind and tending to disturb the conditions upon which gas companies and water companies have invested their several capitals.

Your petitioners humbly pray your Honourable House that the said Bill may not pass into a law as it now stands; and that they may be heard by their agents and witnesses before the committee of your Honourable House before whom the said Bill is pending, in support of the allegations of this petition, and that they may have such other relief in the premises as to your Honourable House may seem meet.

By clause 19, it is proposed that "no person having authority by law to break up or open, or to excavate the road or ground in or across or over which any tramway shall be made, shall, except in case of sudden or urgent necessity, exercise any such authority without having six days previously left notice in writing at the local or nearest office for the time being of the promoters;" so that any gas or water company established by Act of Parliament in any place where a tramway may be laid down, will be unable to open the ground for a service without giving six days notice, a condition which may cause great inconvenience to such companies as are compelled by their special Acts to furnish a supply within a limited period—such, for instance, as the metropolitan gas companies under the Act of 1860. Indeed, the provisions of the Bill are obviously so inapplicable to the metropolis, that the Commissioners of Sewers for the City of London and the Metropolitan Board of Works have petitioned that the Act may not extend to the metropolis.

The clauses for the protection of gas and water companies, inserted in the Railway Clauses Act, 1845, might, we conceive, be incorporated with advantage in any Tramways Act, and that they would give all necessary protection. As those clauses are important, and may be useful for reference, we insert them *in extenso*. It will be observed that the 22nd clause provides amply for access to the pipes at all times; and some such provision should be made in the laying down of tramways:—

Alteration of Water and Gas-Pipes, &c.

XVIII. It shall be lawful for the company, for the purpose of constructing the railway, to raise, sink, or otherwise alter the position of any of the watercourses, water-pipes, or gas-pipes belonging to any of the houses adjoining or near to the railway; and also the mains and other pipes laid down by any company or society who may furnish the inhabitants of such houses or places with water or gas; and also to remove all other obstructions to such construction, so as the same respectively be done with as little detriment and inconvenience to such company, society, or inhabitants as the circumstances will admit, and be done under the superintendence of the company to which such water-pipes or gas-pipes belong, and of the several commissioners or trustees, or persons having control of the pavements, sewers, roads, streets, highways, lanes, and other public passages and places within the parish or district where such mains, pipes, or obstructions shall be situate, or of their surveyor, if they or he think fit to attend, after receiving not less than forty-eight hours notice for that purpose.

Company not to disturb Pipes until they have laid down others.

XIX. Provided always, that it shall not be lawful for the company to remove or displace any of the mains or pipes (other than private service-pipes), syphons, plugs, or other works belonging to any such company or society, or to do anything to impede the passage of water or gas into or through such mains or pipes, until good and sufficient mains or pipes, syphons, plugs, and all other works necessary or proper for continuing the supply of water or gas as sufficiently as the same was supplied by the mains or pipes proposed to be removed or displaced shall, at the expense of the company, have been first made and laid down in lieu thereof, and be ready for use, in a position as little varying from that of the pipes or mains proposed to be removed or displaced as may be consistent with the construction of the railway, and to the satisfaction of the surveyor or engineer of such water or gas company, or society, or, in case of disagreement between such surveyor or engineer and the company, as a justice shall direct.

Pipes not to be laid contrary to any Act, and Eighteen Inches Surface Road to be retained.

XX. It shall not be lawful for the company to lay down any such pipes contrary to the regulations of any Act of Parliament relating to such water or gas company or society, or to cause any road to be lowered for the purposes of the railway, without leaving a covering of not less than eighteen inches from the surface of the road over such mains or pipes.

Company to make good all Damage.

XXI. The company shall make good all damage done to the property of the water or gas company or society by the disturbance thereof, and shall make full compensation to all parties for any loss or damage which they may sustain by reason of any interference with the mains, pipes, or works of such water or gas company or society, or with the private service-pipes of any person supplied by them with water.

When Railway crosses Pipes, Company to make a Culvert.

XXII. If it shall be necessary to construct the railway or any of the works over any mains or pipes of any such water or gas company or society, the company shall, at their own expense, construct and maintain a good and sufficient culvert over such main or pipe, so as to leave the same accessible for the purpose of repairs.

Penalty for obstructing Supply of Gas or Water.

XXIII. If, by any such operations as aforesaid, the company shall interrupt the supply of any water or gas, they shall forfeit twenty pounds for every day that such supply shall be so interrupted, and such penalty shall be appropriated to the benefit of the poor of the parish in which such obstruction shall occur, in such manner as the overseers of the poor of the parish shall direct.

The Bill for the safe keeping of petroleum has been brought in by the Government for the purpose of preventing the accidents that have arisen from the ignition of that highly inflammable substance. The Bill defines "petroleum" for the purposes of the Act to "include any product thereof that gives off an inflammable vapour at a temperature of less than 100° of Fahrenheit's thermometer." It provides that every vessel containing petroleum is to be moored according to regulations issued by the harbour authority, under liability of forfeiture and a penalty of £20 for the contravention of such regulations; it provides that not more than twenty-five gallons of petroleum shall be kept within 100 yards of a dwelling-house or warehouse, except by licence to be given by the local authority, a contravention of such regulation being forfeiture of the petroleum and a penalty not exceeding £20 each day. In case of refusal by the local authority to grant a licence, the applicant may require the ground of refusal to be stated, and he may memorialize the Secretary of State, who may grant the licence required. By the 9th clause of the Bill, petroleum may be searched for in the same manner as gunpowder; and all the provisions of the Act relating to the searching for gunpowder are to be construed as if the word "gunpowder" included petroleum. The American mineral oils, as usually imported into this country, are no doubt extemely dangerous; and it appears, from a series of experiments recently conducted by Dr. Hassall for the *Lancet*, on samples of petroleum oil purchased at different shops, that in seven samples the point of permanent ignition did not exceed 116° Fahr., and that in some it was as low as 57° and 69°, while they gave off inflammable vapour at temperatures much lower. It is contended by the *Lancet* that the standard of safety ought not to be lower than 130°, for, under many circumstances, the oil might be raised to nearly that temperature, at which it would spontaneously ignite. The standard of 100° fixed by the Bill is certainly much too low for safety. The paraffin oil made by the destructive distillation of Boghead coal is a much less inflammable article than the rock-oil of America. From experiments by Dr. Hassall on fourteen samples of paraffin oil, it appears that in no instance did it give off inflammable vapour at a lower temperature than 122°, and that the lowest point of permanent ignition was 135°. It is, therefore, considerably above the *Lancet's* "standard of safety," and, with ordinary care, is free from danger. The Petroleum Bill, even with the low standard of safety which the Government have adopted, will tend naturally to check the large importation of American rock-oil that has lately taken place.

It appears from the proceedings of the St. Olave's District Board of Works and of the Reading Local Board, reported in another column, that attempts are about to be made in those places to carry into effect Mr. Hughes's crotchets respecting the supply of gas to public lamps. It is proposed to measure the quantity supplied by a meter fixed to every twelfth lamp; the lamps being lighted and extinguished by the local authorities. The Surrey Consumers Gas Company are not, however, inclined to accede to such terms, and will only assent to supply gas to the public lamps by meter, on condition that a meter is fixed to each lamp, and that the price to be paid for the gas is equal to that paid by private consumers. The offer made by the gas committee of the parish is, to pay only 3s. 3d. per 1000 feet, and they propose to refer the matter to arbitration, if the offer be not accepted. The Surrey Consumers Gas Company, of course, will not agree to such terms; but the Reading Company have accepted these conditions, and the Bill confirming them now only awaits the Royal Assent to become law. The expense and leakage of the separate service, required for each lamp, are quite sufficient to counterbalance the advantages of supplying a wholesale safe customer, and there is no other reason why the public lamps should be supplied with gas at a less price than the most favoured private consumer.

Mr. Flintoff's visit to Cardiff has been more productive of

excitement than we anticipated. He has held several meetings, at which he declaimed, in his usual manner, against the existing gas company, extolled his own superior knowledge and his vast achievements in other towns in the United Kingdom, and proposed the formation of a new company to supply gas at 2s. 6d. per 1000 feet, and pay dividends at 7½ per cent. There was nothing very exciting in the repetition of this old story; but some indiscreet persons, who attached more value to his speeches than they deserved, commenced a paper war, and this led to rejoinders in terms of the foulest abuse, which, being new to the inhabitants of Cardiff, they stared and wondered, and went to listen to the man who had thus become notorious. Among other fabulous stories with which Mr. Flintoff indulged his credulous hearers, he told them that he had brought seven actions for libel against the JOURNAL OF GAS LIGHTING! and had compelled that vile organ of the gas companies to apologize to him for calumnies of his immaculate character; and he declared his resolution to vindicate his fair name, in the same manner, against all detractors. His audiences have not been numerous; and, if we may judge from the remarks of the *Cardiff Guardian*, they were not of a class capable of responding to his call for £30,000 to form a consumers company in that town. The gas company have replied to the charge of exacting an extortionate price for gas by publishing the rates charged in 290 towns in England, from which it appears that in 259 the charge was higher than in Cardiff, or more than 4s. 3d. per 1000 feet. Facts of this kind cannot fail to expose Mr. Flintoff's fallacies, and the people of South Wales will, we apprehend, not be inclined to embark with their money on so perilous a voyage as he recommends, notwithstanding the alluring prospect of 7½ per cent., with the additional security of having him for their pilot.

The case of *Hills v. The Liverpool United Gas Company* has been argued at great length before the Lord Chancellor during two days of the past week, but we have not thought it worth while to encumber our columns with the repetition of arguments which have been so often urged before the inferior courts of law and equity; we shall, however, report the judgment when it is delivered. The important point for the Lord Chancellor's consideration is, whether the revivifying of a natural oxide is a "precipitation," within the meaning of the plaintiff's patent, and therefore an infringement of it?

Correspondence.

CLAY RETORTS AND EXHAUSTERS.

SIR,—Mr. Keeling must have read my letter through a very distorting medium, which appears to have prevented him from seeing such portions as were inconvenient to notice, and to have substituted certain other imaginary parts—such, for instance, as the "opinions of other gentlemen," whatever that may mean, which he says "I contented myself with quoting." It is, however, satisfactory to find that those opinions—second-hand, if Mr. Keeling pleases, for we will not quarrel about that—have had the effect of making him a little more modest. In his former communication, he boldly undertook to set us all right respecting the generally-received, though mistaken, notion, that using an exhauster is an advantage in working clay retorts; but he now seems to have abandoned that important discovery, and only contends that "the small D retort" worked without an exhauster is the best.

Mr. Keeling thinks that, because there may sometimes be bad settings erected, the duration of the retorts should not be taken into account in a calculation of the most profitable settings. That may be the Reading way of reckoning, but it is surely a defective method; for even clay retorts may be destroyed so quickly by injudicious usage, that their frequent renewal would form a rather important element in the question. As a case in point, I may mention that, some years ago, I happened to look over a gas-work, where extraordinary carbonizing results were said to be obtained—probably, 5000 feet per retort—where I saw beds of three of Mr. Keeling's favourite D clay retorts, though not worked without an exhauster; but I found that the large make of gas was obtained at the cost of half the coke produced being used as fuel, and also a rapid destruction of the retorts, and a free use of cannel to improve the thin gas. Indeed, the manager confessed that he was unable to keep his top retorts up, owing to their supports giving way—a result that was not surprising, considering the intense heat to which they were subjected. Would it not in this case have been a one-sided estimate, to have left out the question of the maintenance of the retorts?

Mr. Keeling takes umbrage at the remarks I made about his objections to beds of more than five retorts. But, does he speak on this matter from experience? Has he ever set or worked beds of more than five? Really, one would think, to read that gentleman's letters, that the knowledge of retort-setting was confined to Reading and himself alone. I, nevertheless, am inclined to think that the "bugbear" he raises will scarcely have sufficient weight—Nottingham notwithstanding—to induce those gas engineers who have abandoned beds of five for more profitable settings, to again go back to that charmed number. It is a fact, worth, at least, Mr. Keeling's experience, that numbers of gentlemen, eminent in their profession, after having experience in beds of five, have adopted larger settings; but I have never heard of any who have done the reverse.

My acknowledgment is due to Mr. Keeling for favouring me with the "leaf out of his carbonizing-book," showing three days make of gas last winter, by a given number of retorts, with the very explicit intimation, that "the coals used were in accordance with the different yields of gas." Any further particulars he has not deigned to furnish, as he "has objections to giving details in a public print;" but, as I never base calculations on such insufficient data, that gentleman must pardon my declining to be much affected by the three days criterion. I prefer the safer average of a season's fair working.

Since what I said in my former letter, about the rapid choking up of the retorts, by the adhesion of carbon, is not disputed, nor the weight of coals which I gave as a fair average charge, and consequent large production of gas per ton, objected to, they may be taken as admitted by Mr. Keeling, who, notwithstanding his evident desire to back out of the assertion of as much gas being obtainable with clay retorts without as with an exhauster, yet "thinks it incumbent on him to reiterate what he before stated." Well, what he before stated, and what he has since added, amounts to this—which Mr. Keeling challenges a refutation of, but which would surely be a work of supererogation, as he must himself see on reflection—viz., that beds of five retorts are the most profitable settings; that clay retorts make as much gas, and of as good quality, without an exhauster as with one; that D retorts make *better* gas, and *more* of it, than any other shape; that he makes 5000 feet per retort in 24 hours, which, as I have already shown, is equal to 11,100 feet of gas per ton of coals; and, with that production—from common coal, I presume, for there is nothing said about cannel—the quality of the gas is equal to 14½ candles.

But, though Mr. Keeling is so positive that no error has crept into his calculations, he has confessed that he knows nothing, for instance, even about the temperature at which his gas is measured; but, then, he is "quite satisfied on that head, because, after allowing a proper (?) amount for leakage, he can make both ends meet:" a truly convenient way, certainly, of "making both ends meet!"

I am almost ashamed, sir, to occupy your valuable space by answering a question that Mr. Keeling ironically asks—viz., whether there is any incrustation of carbon where an exhauster is used?—to which the proper answer is, yes, but not to anything like the same extent as if worked without one. Nor need I travel far for an illustration, but will give that gentleman my experience in the matter in dispute at these works within the last twelve months. I last summer erected a range of ovens, and set them with clay retorts, some of which were at work two months before the exhauster was in action, which was started in the latter part of November; and, although the retorts were obtained from a good maker, the insides being very clean and smooth, they had closed up so much before being scurfed—which was done when the exhauster was started, that it began to be difficult for the men to turn the scoop in some of them. Two of the beds have been at work ever since, without being again scurfed; and there is not now half so much in the worst of them as had accumulated during the first two months.

As a "maximum of information is better than a minimum," I may just add that, instead of only setting five retorts to a fire, I have found it to be an important advantage to heat even nine with one fire—*i. e.*, a duplicate setting of six of 15-in. circular 9-ft. long clays in two pieces, set in a 6-feet wide oven, the waste heat from which plays into a 30-inch wide oven, set with three D irons, placed vertically over each other; and, so well have they answered all my expectations—though they do not make 5000 feet per retort—that I am this summer extending the range on the same principle. The blank bed is let down by simply shutting the damper over its flue, and opening the one over the flue of the bed of six, which is thus at once restored to an ordinary setting. Should Mr. Keeling entertain any chimerical notions of increased fuel for the iron retorts, or have doubts as to their heating, he is very welcome to come at any time, and see and judge for himself.

Apologizing, sir, for the length of this letter, which is the last that I will trouble you with on the subject, I beg to assure Mr. Keeling that, should he happen to be journeying Shrewsburyward, I shall, notwithstanding our little differences of opinion, be very glad to see him at the gas-works.

E. S. CATHELS.

Gas-Works, Shrewsbury, June 21, 1862.

LEAKAGE FROM GAS-MAINS.

SIR,—In your last number, I noticed a communication on leakage from gas-mains. Perhaps, it may not be known to every amateur n the gas business, that there is another method of attaining similar results, by using the station-meter, viz.:—To the outlet of

the meter, between the valve and the meter, attach a pipe, 1 in. or 1½ in. bore, furnished with a stop-cock; the other end to be connected to the holder-outlet, anywhere between the valve and the governor. Then, by opening the meter by-pass, and closing the outlet-valves of the holder and meter, will bring the meter to a standstill. The index and time being taken, and the cock opened at same time, for one hour, by the same mode of procedure, will give the same results. By this method, the pipe may be fitted permanently, and will always be ready as occasion requires. J. Higginson.

Preston, June 25, 1862.

LEAKS IN IRON RETORTS.

Sir,—I have heard it stated that in some instances manganese has been successfully applied in filling up cracks in iron retorts in cases where otherwise they were not much worse for use; and I write to inquire whether any of your practical correspondents can give any information as to the condition and the mode in which that mineral is so applied? Gasmaker.

Gas-Works, Deanhouse, June 27, 1862.

CARBURATING.

Sir,—What does carburating mean, of which we have lately seen and heard so much in some parts of London? Is it a new discovery—a new invention—as well as a new name? No. It means mixing the vapour of naphtha with coal-gas; a process well known as having been patented by Mr. George Lowe, about thirty years ago.

In 1832, the experiment of naphthalizing hydrogen was shown by the writer as one of the illustrations in a lecture on gas-lighting. The apparatus then, and many times since, used, is very simple. It consists of a small, round, tin box, with a stop-cock at each end. At the lower end, a piece of tubing projects about an inch inside. The box is filled with tow, and, the cover, being soldered down, is thoroughly gas-tight. Through one of the stop-cocks must be poured an ounce or two (by measure) of rectified coal-naphtha, which must be shaken about to moisten the tow. The projecting tube prevents the excess from flowing away. Hydrogen is admitted at the bottom of the box, a small quantity being first allowed to pass through to expel the air, and the apparatus is ready for use, and perfectly safe. By its means can be easily shown how quickly, and, in a sense, at certain temperatures, how greedily, the vapours of hydrocarbons mix with hydrogen, carbonic oxide, and some other non-luminous gases; as they do also with coal-gas, and, whilst so mixed, impart luminosity to those first mentioned, and increase the luminiferous properties of the last.

But, although the vapour of naphtha, under favourable conditions, so readily seeks companionship with some of the gases, it must be observed that they never live together on, what may be called, friendly terms. The gas and the vapour never marry; as, in some other cases, coldness separates them. In plain words, the vapour only mixes mechanically, and never combines chemically, with the gas.

What is to be done, and what is not to be done, in practically applying the naphthalizing process to street-lamps, ought to have been known long ago. Why not let the present experiment have a fair trial? In many things, we every day confess that one man is wiser than another, and that one can do well what another is unable to do at all. Nothing is gained by martyring those who differ from us. Some of the greatest absurdities have been believed, solely because they have been too stoutly denied.

Never was there a better opportunity than the carburating process provided for the gas companies, for effecting a most desirable change in supplying gas to public authorities. If the commissioners, for the purposes of carburating, wished their lamps to be supplied with 3 feet, 2 feet, or only 1 cubic foot per hour, why should not their request be complied with? Let there be no needless difficulties put in their way. Nothing could be fairer, nor more reasonable, than that the commissioners should manage the street-lamps in their own way—have small burners or large burners—bright flames or dull flames—lamps alight or not alight. Nothing could be easier than for the gas companies to accommodate them; a meter to each lamp, or to a given number of lamps, conveniently situated, is all that is necessary. This would end all disputing. The alteration could soon be made. A small brick (in cement) tank, with a cast-iron frame and cover, costing 6s. or 7s., to contain the meter, would not be ruinous. What enjoyment there would be at common-council and commissioners meetings; the authorities using their own gas, apportioning it as they please, and knowing both quantity and price! What can be said, on either side, against this plan? J. O. N. R.

Register of New Patents.

2426.—Denny Lane, of the co. of the city of Cork, secretary to the Cork Gas Consumers Company, for "*Improvements in apparatus whereby to regulate the passage or flow of gas, water, or other fluids.*" Patent dated Sept. 28, 1861.

This invention of improvements in apparatus for transmitting power for the regulation of fluids, and for other purposes, relates to apparatus in which a very small initial force is rendered capable of controlling great actual results, as in the case of the steam-engine governor, by operating on the passage of steam, gas, water, or other fluid; such apparatus being therefore very sensitive, and applicable to purposes where great delicacy of movement is required, as in the pumping of gas, during its manufacture, from the retort to the gasholder. It is also equally applicable to purposes wherein extreme sensitiveness is unnecessary, and consists, first, in apparatus which the inventor terms "brake-and-tappet motion," and which is represented in the drawing annexed.

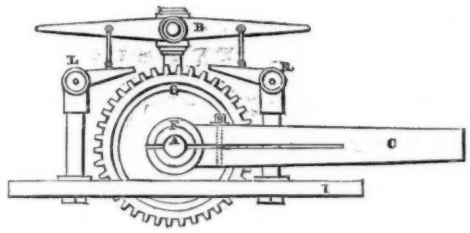


Fig. 1.

G is a toothed wheel, keyed on a spindle, A, which is carried in suitable bearings; the friction-brake is made of boxwood or other material, fitted on the axle, A, and connected by the lever, C, which receives motion from the machine to which it is connected. R, L, are two pawls, or tappets, hinged on pins fixed in the standards at either side of the wheel, G, and suspended from the beam, B, which is free to move on its centre, like the beam of a balance. S is a regulating-screw, to increase the pressure of the brake on the axle, A, or diminish it at pleasure. An ordinary toothed wheel, G, is keyed on a shaft or axle, A, which axle is embraced by a friction-brake, F, connected with a lever, C, which receives a reciprocating motion from any convenient part of the steam-engine or other machine with which it is connected. The reciprocating motion of the brake, F, merely rocks the shaft. At either side of the toothed wheel, G, there are fixed, in pillars or other suitable bearings, the pawls or tappets, R and L, each fixed at such an angle as to allow the wheel, G, to rotate in one direction, but to prevent its motion in the other. Thus, if the one marked L be allowed to come in contact with the wheel, G, the latter can move in the same direction as the hands of a clock, but will be prevented from moving in the reverse direction. Again, if R be in contact with the wheel, G, it will be moved in a direction the reverse to that of the hands of a clock, but will be prevented from moving in the same direction with them. These pawls or tappets, R and L, are suspended from a beam, B, which is moveable round a horizontal axis, and they are suspended at such a height that, when the beam is horizontal, they are both clear of the wheel, G; but, if either end of the beam is depressed, the tappet connected with it at that end descends, and comes in contact with the wheel, G, allowing it to move in one direction only. The amount of pressure or frictional power which the break, F, exerts on the shaft or axle, A, is regulated by the screw, S, which may be tightened when the power is not sufficient to work it; or it may be effected by the brake being made in such a manner as to exert, by its own spring, sufficient tightening power, so that it can move the axle in the direction in which the tappet in contact with the wheel, G, permits; but, when it tends to turn it in the opposite direction, the resistance of the tappet is sufficient to hold the wheel and axle, and the brake-slips, on the latter. Supposing the tappet marked L to be in contact with the wheel, G, the operation of this arrangement will be as follows:—When the lever, C, moves to the right, it carries with it the axle and wheel, G, one or more of the teeth of the wheel passing under the tappet or pawl, L; but, when the lever moves to the left, the tappet or pawl, L, comes into action to prevent the axle and wheel returning with it, and the brake-slips round on the axle. At the next movement of the lever, C, to the right, the same operation is repeated, and another tooth, or number of teeth, will pass under L; so that, by continuing the process, the wheel, G, and its axis, may be made to revolve any number of times. The motion of the lever, C, may be adjusted so as to pass any required number of the teeth of the wheel, G, under the pawl or tappet at each oscillation. The peculiar advantage of this arrangement, which the patentee calls "brake-and-tappet motion," consists in this—that a very small amount of mechanical force is sufficient to determine the position of the beam, B, in either of the three positions which it may assume; and that, as a consequence, the axle, A, and all apparatus connected with it, remain at rest or receive motion, either forwards or backwards, with an amount of force which can be increased to any required extent by increasing the friction of the brake on the axles. The combination of these principles confers on this arrangement the two advantages of extreme sensitiveness and great power.

2. *Double Brake-and-Tappet Motion.*—The simple "brake-and-tappet motion," as hereinbefore described, will move the axle, A, only at a uniform velocity, until the stroke of the brake-arm is altered by hand; but it is proposed to make this variation of the stroke automatic by the following arrangement, which the inventor calls "double brake-and-tappet motion," represented at fig. 2:—The brake-arm is not connected directly with the motive-power, but a portion of the socket embracing the axle, A, is turned circular, and is caught by a second external brake, which has an arm giving the maximum motion required, and having a greater frictional hold on the inner brake than the latter has on the axis. The inner brake-arm carries a segment of a circle concentric with the axle, A, and this segment is divided on its external surface into any equal number of parts by parallel circles. For example: if the circumferential surface of the segment was one inch broad, it may be divided into four equal parts by parallel lines, each part one quarter of an inch. These spaces have each a single ratchet-shaped tooth: these teeth are not placed in one line, but are stepped at different distances. Opposite each of these teeth is placed

a tappet or pawl, which allows motion in one direction, but prevents it in the other. The tappets are so adjusted that, if all are down, the arm of the inner brake would be held tight by them against the forward action of the outer brake, and a permanent stop behind the inner brake-arm holds firm against the backward action of the same. The inner brake, having no motion, communicates no motion to the axle, A, and the whole apparatus remains at rest; but, if the action of the governor, gasholder, thermometer, or other suitable apparatus, is made, as hereinafter described, to lift successively the tappets which hold the inner brake-arm, as these tappets are lifted, the inner brake-arm becomes free to move through a greater angle for each stroke of the outer brake-arm, until the time that all the tappets are lifted, and then it moves through the same angle as the external brake-arm.

The motion of the brake-arm is varied by the following arrangement:—The brake-arm is not connected directly with the engine or other moving power, but is placed near, and in the same plane with an oscillating piece, of equal length, moved by the engine. This oscillating piece has its centre in the opposite direction from the brake-arm, so that between the two arms there is placed a sliding piece, which is free to move with the two arms, and communicate the motion from one to the other. This sliding piece is also free to move in the direction of the length of the arms. If placed in the middle part of the two arms, it will move through the same angle; but the angle through which the brake-arm is driven becomes greater or less, in a rapid ratio, as the sliding piece is moved nearer to or further from the centre of the motion of the brake-arm.

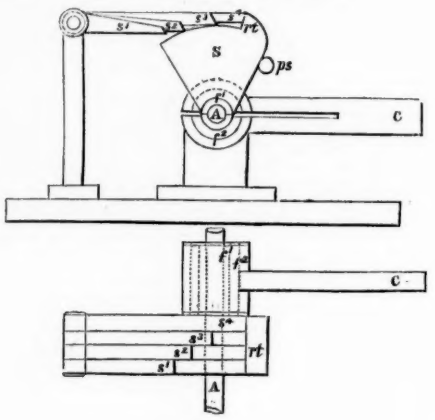


Fig. 2.

In fig. 2, S represents the segment carrying the ratchet teeth, r, t, and fastened on the inner brake, f^1; A, the axle or spindle embraced by the inner brake, f^1; f^2, an outer brake embracing the inner one, and which is itself embraced by the lever, C; s^1, s^2, s^3, s^4, are stops, which are represented as all down in the drawing; p, s, a permanent stop behind S, to prevent its movement when the other brake makes its backward motion. Now, if s^4 be lifted, the motion of the outer brake will carry S, and consequently the axle, A, and machinery connected with it, through the angle, r, t; and, if s^3 be raised, it is carried on until stopped by s^2. If s^2 be lifted, it will be carried on to s^1, which is equivalent to increasing the angle moved through at s^4 three times. If s^1 be lifted, the motion of s is only limited by the motion of the outer brake, f^2, and it will consequently move through the same angle.

3. *Application of the "Brake-and-Tappet Motion" to govern ordinary Steam Engines.*—The foregoing is employed to regulate the supply of steam to a steam-engine in the following manner:—The axle, A, is connected by a suitable gearing to a slide, throttle, or other valve upon the pipe supplying steam to the engine, and in such a manner that the revolution of the axle and wheel, G, in one direction will gradually open, and the other gradually close, the valve. The beam, B, is connected with an ordinary centrifugal or other governor, of very small dimensions, in such a way that, when the engine moves at its proper or mean speed, the beam will be in its horizontal or neutral position; but, if the speed be increased or diminished, the governor, acting on the beam, B, moves it out of the horizontal position, and by so doing brings one or other of the tappets into contact with the wheel, G. Then the axle, A, and the valve connected with it, are moved so as to diminish or increase the supply of steam, as the case may be; such motion being continued until the engine arrives at its mean rate of speed, when the beam again assumes the horizontal position. The lever, C, is connected by linkwork with the eccentric or any convenient reciprocating part of the engine. The advantages of the "brake-and-tappet motion" in this case is, that it enables a very small and delicate centrifugal or other governor to regulate the speed of an engine of any size.

4. *Application of the "Brake-and-Tappet Motion" to the Gas-Exhauster-Engine.*—In many cases, where motive power has to be employed, it is necessary that the speed should be varied with the amount of work to be done. For example: the exhauster employed in gas-works must increase its velocity in proportion to the quantity of gas generated at the time. As the exhauster is almost universally connected directly with the engine, it is necessary, therefore, that the speed of the engine should vary in the same ratio. In this case, the other connexion being the same, the beam, B, from which the pallets are suspended, is in connexion with a small gasholder (which receives its supply from the inlet-side of the exhauster), and in such a way that, when the exhaustion is produced at the proper rate, the beam is horizontal. If, however, the exhaustion be too rapid for the quantity of gas being made, a partial vacuum will be produced, the small gasholder drawn down, and one end of the beam depressed, thereby bringing into action the tappet or pallet at that end, which will cause a revolution of the axle, A, and wheel, G, in the direction, which will gradually shut off the steam. On the other hand, if the exhaustion be not sufficiently rapid to draw off the gas as quickly as it is generated, a pressure will be caused in the main which will raise the gasholder, and, depressing the other end of the beam, B, will bring into action the pawl or tappet, which allows the axle and wheel to rotate in that direction, which will gradually open the valve with which it is connected, and thereby increase the supply of steam until the proper amount of exhaustion is attained, when the beam, B, will return to its horizontal or neutral position. The gasholder used to act on the beam, B, may be counterpoised and adjusted so as to bring the pallets into action at any desired point, either of pressure or vacuum. It is sometimes desirable to prevent too great a vacuum at the inlet of the exhauster by opening a valve on a pipe connecting the inlet and outlet of the exhauster, the effect of this being to allow a portion of gas, at a high pressure, to pass from the outlet to the inlet, and thus diminish the vacuum. The patentee only claims the arrangement for effecting this which is hereinafter described. An apparatus of the brake-and-tappet kind, in all respects similar to that employed for regulating the supply of steam to the exhauster-engine, is connected with a throttle or other valve on that pipe which connects the outlet and inlet of the exhauster. It is found desirable to employ these two modes of regulation in conjunction, in the following manner.—The motion of the throttle or other valve on the gas-pipe is made more rapid than that on the steam-pipe, the latter being made exceedingly slow. If the motion of the steam-valve be too rapid, the speed of the engine has a tendency to oscillate to one side or other of the appropriate speed. On the other hand, too slow a motion of the steam-valve may not check or increase the speed of the engine sufficiently fast when great changes take place in the amount of work which it has to do. In such a case, the regulator of the gas-valve comes into action, and the small gasholder is so connected with the beam, B, as not to deflect it from the horizontal position until some considerable amount of vacuum—say one-half an inch of a column of water—is produced. The beam in connexion with the tappets actuating the steam-valve, however, is so adjusted as to come slowly into action when the pressure varies to the smallest extent either above or below its normal point.

[Sections 5 to 8 refer to the employment of the principle illustrated in the foregoing sections, to the regulation of the pressure of steam in boilers, the admission of feed-water, the supply of injection-water, and the governing of water-wheels. Sections 9 and 10 refer to another contrivance for the same purposes.]

11. *Gas-Supply Governor.*—In order to give to consumers a sufficient supply of gas without being excessive, it is necessary that the initial force with which it is delivered from the works should vary at different hours. This is effected in the ordinary governor by taking off or putting weights on the governor and its counterpoise by hand. This is done by an automatic apparatus, as hereinbefore described. A strip of pasteboard, or other laminated material, is moved by clock-work at an equal rate, and divided by lines perpendicular to its line of motion into equal parts, representing the twenty-four hours, and any convenient sub-multiples of them. One edge of this card is straight, and the other is cut to a curve, of which the co-ordinates are proportional to the different pressures required at the different hours represented by the several divisions. Close by this curve or strip stands a small gasholder, similar to those used in the ordinary pressure-register, and which rises in proportion to the pressure of gas within it, the scale being equal to the scale upon which the ordinates of the curve are drawn. The gasholder is surmounted by a rod, which carries at its upper extremity a beam, one end of which carries a roller resting on the curved part of the card; the whole being so adjusted that the beam remains horizontal, if the actual pressure of the gas is equal to that indicated by the curve as being required for that particular hour. If, however, the actual pressure of the gas be greater or less than that required at any given time, the beam will be thrown out of level the one side or the other; and this deflection of the beam is employed to change the pressure, so as to make it coincide with that indicated by the curve in one of the methods hereinafter described:—

First, the deflection of the beam may bring into contact one of two electro-magnets, one of which opens a cock, which allows water from a reservoir to flow into a vessel placed on the top of the gasholder of the ordinary main-governor, and the other of which brings into contact the electro-magnet which opens a cock allowing water to escape from the same vessel. The weight of the water increases or diminishes the pressure of the governor.

Second, the beam, B, may have a pointer, L, at right angles, like the index of the ordinary balance, the motion of which may be conveyed by a suitable bell-crank to the beam, B, of the "brake-and-tappet motion" hereinbefore described, and the brake-and-tappet motion may be made to open cocks in a similar way. The curve may be a spiral, of which the ordinates are measured in the radii of a circle. The strip of pasteboard or card, already mentioned, instead of being cut to a curved line, may have cut on its edge or edges, a series of successive elevations or depressions, which may resemble the teeth of a ratchet-wheel. When a change of pressure is required at any particular hour, the surface of the card has cut upon it as many successive elevations or depressions as there are tenths (of an inch of a column of water) pressure to be added or taken off. Each such elevation may be made to increase the pressure, and each depression to diminish the pressure of the governor, by permitting a definite quantity of water to flow into and out of the vessel already mentioned. This quantity of water may by its weight be able to produce a change of pressure of one tooth. To obtain this definite quantity of water, the patentee employs what he calls a "unit-vessel," which is provided with an inlet and outlet-valve, so connected that when one valve is open, the other must be shut. If the unit-vessel be supplied from any source higher than its upper open extremity by the inlet-valve, it will receive and deliver a constant quantity for each time that the position of valve is changed. This change is proposed to be produced by the action of a beam provided with a roller, which is deflected to one side or other by the elevations or depressions already mentioned. Instead of elevations or depressions cut upon a card, pins may be attached in the proper places on a wheel revolving once in 24 hours, and the forms or positions of those

pins may be made to actuate valves, so as to increase or diminish the the weight of water on the governor or its counterpoise at the several times indicated by their position in the wheel.

In order to govern the passage of gas through a main, an hydraulic valve is employed of the ordinary construction. The inlet and outlet-pipes communicate with an air-tight box placed immediately below the level of the main; the inlet and outlet are separated by a partition of circular or other form which descends into the box for some portion of its depth. Below the partition, the space remains open between its lower extremity and the bottom of the box, through which the gas is free to pass. A small pipe from any source supplying water or other suitable fluid communicates with the box; and, if water is admitted, the area of the opening beneath the partition is gradually diminished, until, finally, the gas is altogether shut off. A small gasholder, diaphragm, or other pressure-indicator moved by the gas, is so connected with the pipe communicating with the box, that it opens or closes one of two cocks or valves, by one of which water is admitted, and by the other of which water is allowed to escape from the air-tight box, in the former case diminishing, and in the latter increasing the area of the passage between the bottom of the partition and the surface of the water, and thus regulating the supply of gas.

2436.—Charles Hill Pennycook, of Glasgow, in the co. of Lanark, N.B., for "*Improvements in chimney-hoods and ventilators.*" Provisional protection only obtained. Dated Sept. 30, 1861.

This invention relates to improvements in apparatus designed to assist the egress of smoke from chimneys or vents, and prevent down-draught, and also applicable for inducing and assisting the ingress or egress of air when fitted to ventilating ducts.

The apparatus arranged as for a chimney-hood consists of a cylindrical shell, formed or divided internally so as to present one or more helical or screw-shaped passages, and mounted upon an upright spindle so as to revolve as freely as possible. The lower edge of the cylindrical shell dips down into an annular trough formed in the bottom or part by which the apparatus is fixed upon the chimney or vent, and to which the spindle is fixed. This trough being filled with water which will be continually replenished by rain, forms a liquid joint, and prevents interference with the internal current at that part. A cap is attached to the drum or cylinder at a slight distance above it, the smoke having free egress laterally or radially between the two. The revolving cylinder and cap are both formed with external pocket-like vanes having the sides inclined, but with no openings through into the interior as with vaned hoods hitherto constructed. The slightest external air-current by acting on the vanes causes the hood to revolve, and the vanes being set in a suitable direction relatively to the internal screw, the latter in turning exerts an upward drawing or propelling action on the smoke. At the same time, the upper openings of the smoke passages, in consequence of their helical form, baffle and prevent any tendency of the air to enter and descend, and from the motion of the cylinder are as it were continually receding from any inwardly directed current. To insure the hood's continuing to revolve freely, a cup is provided to contain oil which keeps the bearing constantly lubricated. This oil-cup is opened by unscrewing the top cap, but an additional internal screw-plug is provided so that the hood may be handled without upsetting the oil when the cap is off. To prevent noise, a washer or bearing-piece of leather or such like material is fitted in the tube surrounding the central spindle, this soft material preventing concussion and friction between the metal parts.

The apparatus constructed as described is applicable as a ventilator to assist the egress of air, but, to assist the ingress of air, the internal screw-passages must be reversed, the external vanes remaining the same, or *vice versâ*.

As the rotatory speed of the screw-cylinder may be too great sometimes, and particularly in some applications, as, for example, on railway-engines and carriages, this invention further contemplates the application of an appliance such as a frictional brake for moderating the speed, the action of such appliance depending on the centrifugal force arising from the rotation.

2444.—Oscar Octave Lesourd, of Paris, but temporarily residing in Panton Street, London, barrister, for "*Improvements in joining pipes and tubes, or in forming or securing the joints thereof.*" A communication from abroad by Jules Lemoine, of 34, Rue Saint Paul, Paris, France. Patent dated Oct. 1, 1861.

The object of this invention is to obtain an improved joint for pipes and tubes, with a view of preventing or resisting the leakage or waste of the gas or other matter conveyed through the pipes or tubes. For this purpose, a box is placed or fitted over the joint, junction, or nearest ends of the pipes or tubes to be joined or secured, into which box is introduced a cement or other substance hereinafter called the "sealing agent," after which the box is sometimes removed, but sometimes left on. It is preferred to form the box of two pieces connected by hinge-joint, binding-ring, or otherwise, and it is preferred to keep it in place on the pipes or tubes by collars, and to furnish it with a screw or other instrument for closing or tightening it. It is constructed with an opening for admitting the "sealing agent."

It is mostly desirable to form the box with ends or necks fitting closely round the tubes. The sealing agent may sometimes be applied to plaster or coat the outside of the box, or to close it where its necks or ends surround the pipes, either instead of or in addition to the introducing of the sealing agent within it. The mechanical joint, fitting, or pipe-end that it is preferred to use when the box is applied, is a form of the socket-fitting—that is, the fitting in which the end of one pipe is formed with a collar—and enters a mouth or socket formed at the end of the other pipe, the socket being of larger diameter than the body of the pipe, and terminating in a flange.

The "sealing agent" is a material proper for closing, securing, completing, or forming the joint, with a view to render it as tight, sound, or secure, as may be, and the agent to be adopted for this purpose is, in many cases, sulphur in a state of fusion alone, or mixed with peroxide of iron, or with red or yellow ochre, or other similar ingredient, and at a temperature of at least 170° centigrade, or 338° Fahr.; but other substances may be used as the "sealing" agent, such as lead, tin, alloys, and metallic amalgams, resins, gums, pitch, gelatine, alumina, soap, gum lac, copal, melted and marine glue, and other matters, alone or combined with other ingredients. To facilitate the adhesion of the sealing agent to metal surfaces, the metal may be sometimes oxidized, and roughened file-fashion or otherwise.

The claim is for joining pipes and tubes or forming or securing the joints thereof by means of a box to be used with a "sealing agent," as hereinbefore described.

2457.—John Ambrose Coffey, of Providence Row, Finsbury, in the co. of Middlesex, engineer, for "*Improvements in engines or apparatus for obtaining the motive power of steam, water, air, gas, or fluids.*" Provisional protection only obtained. Dated Oct. 2, 1861.

This invention consists in the construction of an engine or mechanism for the obtaining of the motive power of steam, water, air, gas, or fluids in the manner following—viz., a central pipe or duct of any suitable kind is provided, from which radiate other pipes or ducts, at the other ends whereof are angled stopped pipes, cylinders, or ducts, and at or near the junction of the radial pipes or ducts and those last mentioned are openings (one to each radial and its angled pipe or cylinder aforesaid), and these openings are made to slide air-tight against a fixed annulus, so that upon steam, air, or other fluid being admitted into the central pipe or duct, and filling the radial pipe or duct, it will exert pressure against the said annulus so as to cause rotation; the central pipe or duct and the attachments aforesaid being constructed free to turn in the centre.

Instead of this arrangement, modifications of the details thereof may be used thus—the aforesaid radials and attachments may be fixed, and the annulus moveable; also, instead of the steam, water, air, gas, or other fluid being admitted at the central duct, it can be admitted to a valve-way extending the whole length of the annulus, the radials in this case being solid, and the angle-pipes or cylinders alone being hollow. Other modifications of the details, as for reversing the action or otherwise, will be apparent to the practical man.

2473.—William Malam, of Skinner Street, in the City of London, gas engineer, for "*Improvements in apparatus for the manufacture of gas.*" Patent dated Oct. 3, 1861.

Instead of the usual mode heretofore adopted of feeding retorts by hand (by opening the end or mouthpiece), a self-acting feeding apparatus is employed. For this purpose, a hopper or charging-box is fitted, so that its discharge-end may be within the retort; and within the retort a scoop, shovel, tray, or box is placed, capable of travelling to and fro therein, and having a portion of its top covered with a lid, or fitted with a plate, while another portion is open. When the open portion is below the hopper-mouth, the scoop or tray fills with the coal or substance to be fed in, and the scoop is then caused to move till its open part comes away from the hopper-mouth, and its other part comes under and closes it, and when it reaches the end of its travel in this direction it is driven back sharply, so that it may discharge its contents into the retort, and return for a fresh supply. This may be done in one arrangement, by moving the scoop or tray away from the hopper by a rack, screw, or other contrivance worked by a wheel with teeth on a portion of its periphery, the scoop in its motion compressing a spring, so that when the rack comes to the smooth part of the wheel the spring is free to act, and forces the scoop back again. The shock of the tray by shaking the hopper facilitates feed. The speed of the scoop's travel may be varied by a train of wheels or multiplied gearing. The spring may, however, be otherwise acted on, and set free by other arrangements. Thus, this arrangement may be adapted for being worked by hand, by furnishing the scoop or tray with a shank or handle extending out of the retort; it is in that case also combined with a spring, so that, on releasing it to the action of the spring, it will discharge.

In another arrangement, a hopper is used, having at bottom a valve, door, or moveable end, which is opened and closed by mechanical means, or it may be done by hand, a shank passing out of the retort—thus, for example, it might be opened by a shank and closed by a spring; and the coal or substance may be dispersed or distributed by a V or other shaped bar or convenient contrivance. When retorts are placed or arranged in casings of fire-clay or such like refractory material, then, instead of constructing this casing in one piece, it is formed of a number or series of pieces, so that any one of them may be repaired or replaced without having to repair or replace the whole casing.

The casing consists of a series of separate arches lying one behind the other, but close together from end to end of the retort; each arch consists of two sections or halves meeting at top, with a step fitting so as to form a complete arch, and resting at bottom on a fire-clay bed, which may be in one or more pieces; the edges of the sections are bevelled, so that the edges of the adjacent arches overlap or lie one against the other. If any one of these sections has to be removed, to be repaired or replaced, this may be readily done without disturbing the others. Other forms than arches may be adopted to suit the shape of retort.

The claims are for—

1. The application to a retort of a hopper and travelling scoop or tray, arranged and combined substantially as described, whereby the feed is effected and interrupted.

2. The application to and combination with a retort of a hopper communicating therewith, for effecting the feed, the communication between hopper and retort being opened and closed by a valve-door, or moving or moveable end, whereby the feed is controlled substantially as described.

And in respect of the retort-casing, the claim is for the construction of the casing in pieces substantially as described, so that any one of the pieces can be removed or replaced without disturbing the others.

2491.—Patrick O'Connor, of Wavertree, near Liverpool, in the co. of Lancaster, ironmonger, for "*Improvements in the construction of gas-stoves for heating and warming.*" Provisional protection only obtained. Dated Oct. 5, 1861.

This invention relates, firstly, to improvements in portable gas-stoves or apparatus for heating water in baths and other vessels. Hitherto, in the application of gas for raising the temperature of liquids, it has been usual to apply the gas to the vessel containing the water, or to a supplementary vessel placed alongside and communicating with the main body. By this

invention, however, contrary to all others, the stove or apparatus is almost entirely immersed in the water, and the gas is conveyed thereinto by a flexible or jointed tube, so that as soon as the desired temperature has been obtained, the said stove or apparatus can be removed from amongst the water. The principal part consists of an U, serpentine, coiled, or other suitably-shaped metallic casing, exposing a large surface to the water for effective distribution of the heat. The gas from the tube above referred to is burned at jets fixed in a T or other bracket, by preference under a part of the apparatus formed into an arch, and combustion is maintained by supply of air received at one end of the apparatus, the products being carried through the apparatus to the other end, where, by a small intercepting inverted cup situate just over the surface, they are thrown on to and absorbed by the water being heated, thus preventing the escape of noxious effluvia into the atmosphere; and, secondly, to improvements in gas-stoves or apparatus for warming rooms, halls, conservatories, and other apartments and buildings. Here the object is to expose a large superficial metallic area for the radiation of heat; this is secured by the form of stove or apparatus hereinafter described, within the casing of which water is made to circulate in every part, and, if desired, may circulate or be carried through pipes or other conductors a considerable distance. The bottom framing supports and communicates internally with a saddle boiler, from both ends of which are water spaces carried vertically, resembling with the semi-circular or arched communication on the top an inverted U. On the top of this arch a water-supply cistern or expansion head is placed, from which a pipe is carried through one of the legs down near to the bottom. The gas-jets are applied under the saddle-boiler, and, as the bracket conveying the gas is jointed, the lights may be used for illumination or any other purpose, when further heating of the stove is unnecessary. The products of combustion are carried through a flue in one of the legs of the inverted U, and allowed to escape over the surface of the water in the cistern or expansion-head in a similar manner to the discharge in the apparatus first herein described, or any other absorbent may be used. Any steam generated in the apparatus is carried off by a suitable pipe, and condensed in the water expansion-head.

2495.—William Clark, of 53, Chancery Lane, in the co. of Middlesex, engineer and patent-agent, for "*An improved gas regulator and purifier.*" A communication. Provisional protection only obtained. Dated Oct. 5, 1861.

This invention relates to a new gas purifier and regulator, which filters the gas before being consumed in the burner. For this purpose a plug or mass of felt, wadding, or flock, is placed in an enlargement or chamber made in the base of the burner, through which the gas passes, and is thereby purified, and burns under a constant and steady pressure. It also produces a saving in the consumption of gas.

2496.—Thomas Hughes, of Birmingham, in the co. of Warwick, manager of the Imperial Iron Tube Company, for "*An improved high-pressure tap for regulating and controlling the flow of steam, water, or other fluids.*" Patent dated Oct. 5, 1861.

These improvements in taps, whether used for regulating the flow or the drawing off of fluids, are applicable for general use, but more particularly for high-pressure purposes, whether for steam, water, or other fluids; and the invention consists in making the plug taper and hollow, so as to permit the fluid under all circumstances to enter the interior of the plug, and, by its force being exerted in all directions equally, the plug will not be liable to be tightened by the pressure of the fluid, or to work loose. This object is effected by forming a number of radial holes or apertures around the top or enlarged part of the plug opposite the flow-way into the plug, and at the lower or small end of the plug is formed one hole or flow-way, which, being turned opposite the nose or front flow-way of the tap, permits the fluid to escape, or to be drawn off, or to flow through, as required. The plug may be retained in the body or barrel of the tap by a washer and screw at its smaller or lower end, or by a collar surrounding the neck of the plug at the top, screwed or otherwise secured to the body of the tap, or otherwise as may be preferred, according to the purpose or shape or design in which such taps or cocks may be required to be made.

In taps constructed according to this invention, it will be seen that the hollow plug is always in equilibrium, however great the pressure acting upon it may be.

The claim is for the construction of taps for regulating and controlling the flow of steam, water, and other fluids, with a plug of conical or taper form, and hollow, with radial openings or apertures for the admission, and with an aperture for the exit of fluid, substantially in manner hereinbefore described.

2504.—Frederick John Evans, of the Chartered Gas-Works, Horseferry Road, Westminster, gas engineer, for "*Improved apparatus for generating gas.*" Patent dated Oct. 7, 1861.

The object of this invention is to expedite the manufacture of gas, and effect an important economy both in the manipulation of the process, and in the construction of the gas-generating apparatus. To this end, instead of using, as heretofore, a series of horizontal retorts, set side by side in a furnace, for generating a given amount of gas, a vertical retort, of large capacity and of peculiar construction, is employed in lieu thereof, enclosed within a furnace or oven, and surrounded by a heating flue, which leads from the fire-place, and rises spirally around the retort, until it reaches the exit-opening to the chimney.

The claim is for the constructing of gas-generating apparatus in the manner and for the purpose above described.

2516.—William Smith, of 21, King Street, West Smithfield, in the co. of Middlesex, gas-meter manufacturer, for "*Improvements in apparatus for measuring and regulating the pressure of gas.*" Patent dated Oct. 9, 1861.

These improvements relate, first, to that kind of meter termed a consumer's compensating gas-meter, and consist in the mode of constructing the level-pipe, which is so arranged that it can be adjusted to the proper level by means of a stud or button at the exterior of the meter, the said level pipe being made of a flexible material, such as vulcanized india-rubber, or, if preferred, of lead. At the outlet of the meter is placed a float in water, on which the outlet-pressure acts, and to the float is connected a cone working in a valve, for the purpose of regulating the pressure of the outlet-gas.

2. To prevent the obtaining of gas when the meter is tilted, and so made to measure incorrectly, a rod, swinging on a pivot or pivots, is hung to the back plate of the meter, which, when the meter is tilted, swings forward and comes in contact with a projection on the measuring-wheel; as its rotation is thus arrested, the supply of gas is stopped. This is only applicable when the meter is not sufficiently tilted to expose the centre opening.

3. To regulate the throw of the diaphragm in dry gas-meter, a crank is placed on the valve-shaft, and a small lever is inserted in a socket made in the extremity of the said crank to which the connecting-rods of the diaphragms are attached. The small lever is fixed by means of a set-screw; therefore, when it is required to change the throw of the diaphragm, it is only necessary to loosen the set-screw and adjust the small lever.

4. To the metal plates used on the service of dry gas-meters, instead of covering the edges and face of the same with leather, a smooth edge is made by a piece of metal turned over the edges, thus dispensing with the leather facing; also in dry meters the inlet and outlet-pipes are arranged within the outer casing for convenience of packing.

5. The invention relates to single light governors; but it may also be applied to more lights. It is constructed in the following manner:—A cone, which can be adjusted by a screw cut on the stem of the same, is fastened in the outlet-pipe of the regulator, and beneath it is placed a diaphragm (made of a flexible material, such as india-rubber), and has a hole pierced in the centre serving for a valve; any variation of the pressure of the gas raises or lowers the flexible diaphragm, and enlarges or lessens the aperture in the diaphragm through which the gas passes; thus, when the pressure increases the passage is lessened, and *vice versâ*.

6. To indexes of all kinds of meters to make all the hands on the dials turn in the same direction, an intermediate pinion between the usual wheels and pinions is used.

2527.—William James Williams, of Warnford Court, in the City of London, for "*An improved process of charging illuminating gas with the vapour of the hydruret of carbon, for the purpose of increasing its illuminating properties.*" Provisional protection only obtained. Dated Oct. 10, 1861.

This invention consists in causing illuminating gas in its passage from the meter to the burners to pass through a series of rows of perpendicular cords or threads, or their equivalents, saturated with hydrocarbon liquid, by which it becomes charged with hydrocarbon vapour; and, as the gas is liable to become overcharged with the vapour, and cause a waste of the hydruret of carbon, often becoming very troublesome by condensing and filling up the pipes, obstructing the flow of the gas, and flowing out at the burners when opened, the gas is caused to pass through a condenser, where the excess of hydrocarbon vapour is condensed, and the liquid resulting from the condensation flows back to the evaporating chamber, or some other receptacle, from which it can be returned to the evaporator, while the gas in a properly charged state passes on to the burners.

APPLICATIONS FOR LETTERS PATENT.

1774.—Richard Archibald Brooman, of 166, Fleet Street, London, E.C., for "*Improvements in coking-ovens, in collecting and utilizing the products resulting from the distillation or carbonization of coal and other matters, producing coke, and in apparatus employed therein.*" A communication. June 14, 1862.

1790.—John Nield, ironfounder, and Thomas Arthur Nield, engineer, both of Dukinfield, Cheshire, for "*Improvements in moulding or manufacturing pipes, columns, or other similar articles of cast iron or other metals.*" June 17, 1862.

1800.—Francis Coltman, of Normanton, Yorkshire, carpenter, for "*Improvements in apparatus for discharging coals, minerals, or other substances.*" June 18, 1862.

1815.—Joseph Gustave Dupuch, of Paris, brassfounder, for "*Improvements in cocks for regulating the supply of gas.*" June 20, 1862.

1822.—Joseph Walter Taylor, of Newsome, near Huddersfield, Yorkshire, manufacturer, &c., for "*Improvements in valves, and in means for regulating and indicating the flow and pressure of fluids.*" June 20, 1862.

1834.—Stephen Holman, of 18, Cannon Street, London, E.C., engineer, for "*Improvements in pumps and valves.*" June 21, 1862.

1865.—Abraham Bayley, of Liverpool, Lancashire, oil-merchant, for "*Improvements in lamps.*" June 25, 1862.

1876.—John Parkes, of London Street, Paddington, London, W., gas engineer, for "*Improvements in gas-lanterns.*" June 26, 1862.

GRANTS OF PROVISIONAL PROTECTION.

1282.—Alfred Henry Fielden, of 35, Castle Street, Holborn, London, W.C., commercial traveller, for "*Improvements in show-jars, lamps, signals, and light-houses, and other methods of illumination.*" April 30, 1862.

1551.—William Roberts and Thomas Greenacre, of Millwall, London, E., for "*Improvements in cocks or valves for steam or other fluids.*" May 22, 1862.

1574.—Jean André Cécile Nestor Delpech, of Castres, France, manufacturer of engines and machinery, for "*Improvements in pumps.*" May 26, 1862.

1623.—William Footman, of 5, Great Queen Street, Westminster, London, S.W., for "*Improvements in the treatment and use of sewage and liquid manures, and in reservoirs and pipes to be used therein.*" May 30, 1862.

1640.—William Thomas Smallwood, of Narrow Street, Limehouse, London, E., and William Wright, of Dean's Buildings, West India Dock Road, London, E., for "*Improvements in water-closets.*" May 31, 1862.

1660.—Joseph Baker, of Coatbridge, Lanark, N.B., tube manufacturer, for "*Improvements in pumps.*" June 2, 1862.

1670.—Goldsworthy Gurney, of Bude, Cornwall, for "*Improvements in apparatus for production and application of artificial light.*" June 3, 1862.

1675.—James Lee Norton, of Belle Sauvage Yard, London, E.C., for "*Improvements in machinery for raising and forcing water.*" June 3, 1862.

1692.—George Rydill, of 5, Wardrobe Place, London, E.C., architect, for "*An improved hydraulic pump or engine for raising liquids and obtaining motive power, also applicable for the ventilation of mines and other useful purposes.*" June 5, 1862.

1703.—William Edward Newton, of 66, Chancery Lane, London, W.C., civil engineer, for "*Improvements in the construction of organs and other wind instruments, parts of which improvements are also applicable for regulating the pressure and flow of gas and air.*" A communication. June 5, 1862.

1714.—James Lovegrove, of Dalston Lane, Hackney, London, N.E., surveyor, for "*Improvements in apparatus for inspecting small sewers and drains, and for facilitating the removal of obstructions therein.*" June 9, 1862.

1718.—John Keeling, of Reading, Berks, for "*Improvements in apparatus for the manufacture of gas.*" June 9, 1862.

1733.—John George Appold, of Wilson Street, Finsbury Square, London, E.C., gentleman, for "*Improved apparatus for regulating the discharge of water and other liquids, and air and other gases.*" June 10, 1862.

1774.—Richard Archibald Brooman, of 166, Fleet Street, London, E.C., for "*Improvements in coking-ovens, in collecting and utilizing the products resulting from the distillation or carbonization of coal, and other matters producing coke, and in apparatus employed therein.*" A communication. June 14, 1862.

1800.—Francis Coltman, of Normanton, Yorkshire, carpenter, for "*Improvements in apparatus for discharging coals, minerals or other substances.*" June 18, 1862.

NOTICES TO PROCEED.

324.—Peter Shaw, Edinburgh, gentleman, for "*Improvements in lamps.*" Feb. 7, 1862.

366.—John Robb, of Aberdeen, N.B., merchant, for "*Improvements in ventilation, and in apparatus employed for that purpose.*" Feb. 12, 1862.

376.—John Stephen Joseph, of Rhostyllan, near Wrexham, Denbigh, N. Wales, for "*An improved retort-oven, and the utilization of the spare heat from the same.*" Feb. 13, 1862.

423.—Edward Thomas Hughes, of 123, Chancery Lane, London, W.C., for "*An improved method of, and apparatus for, collecting the gases given off from furnaces.*" A communication. Feb. 17, 1862.

439.—Frederick Barnett, of 230, Oxford Street, London, W., for "*An improved lamp or lantern for street lighting and other purposes.*" Feb. 19, 1862.

495.—Lewis Davis, of Gloucester Gardens, Hyde Park, London, W., Esq., and Frederick Major Parkes, of Marylebone Road, London, N.W., gentleman, for "*An improvement in the production or manufacture of gas for lighting and heating.*" Feb. 24, 1862.

499.—John Carnaby, of 7A, Skinner Street, London, E.C., for "*Improvements in turning, managing, and regulating the taps and valves of gas-pipes.*" Feb. 25, 1862.

578.—Thomas Tillam, of Church Street, Deptford Green, Kent, cremating manufacturer, for "*An improved method of purifying gas.*" March 3, 1862.

1602.—Ralph Martindale, of Birmingham, Warwickshire, lamp-manufacturer, for "*Improvements in the manufacture of globes and glasses, more particularly applicable to hydrocarbon and spirit-lamps, and also in fastenings for securing the globes or glasses in those and other descriptions of lamps.*" May 28, 1862.

1692.—George Rydill, of 5, Wardrobe Place, London, E.C., architect, for "*An improved hydraulic pump or engine for raising liquids and obtaining motive power, also applicable for the ventilation of mines and other useful purposes.*" June 5, 1862.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £50 BEFORE THE EXPIRATION OF THE THIRD YEAR.

55.—George Kennedy Geyelin, "*Regulating gas-burners, which he calls 'The universal gas-burners-regulator.'*" Jan. 7, 1859.

125.—William Davis, "*Improvement in sluice-valves.*" Jan. 14, 1859.

161.—Thomas Clarke, "*Improvements in the manufacture of core barrels for pipes, or columns used either for railway piles or columns, or for water-pipes or sewerage-pipes.*" Jan. 19, 1859.

177.—William Edward Newton, "*Improved apparatus for measuring water and other liquids.*" Jan. 20, 1859.

189.—Richard Howell, "*An improvement or improvements in taps or stop-cocks.*" Jan. 21, 1859.

203.—Edward Dorsett and John Bennington Blythe, "*Improvements in the distillation of oil from coal-tar, and in apparatus for preserving timber therewith.*" Jan. 22, 1859.

208.—Richard Barter, "*Improvements in heating and ventilating buildings, and in apparatus connected therewith.*" Jan. 22, 1859.

212.—Richard Archibald Brooman, "*Improvements in pumps.*" Jan. 24, 1859.

217.—Arthur Warner, "*Improvements in the manufacture of iron, and gases for such and other uses.*" Jan. 24, 1859.

230.—Henry Brecknell, "*Improvements in cocks and valves.*" Jan. 25, 1859.

278.—John Peter Booth, "*Improvements in ventilating ships.*" Jan. 31, 1859.

297.—Edward Wilkins, "*Improvements in drain-pipes and tiles for draining and liquid-manuring land.*" Feb. 2, 1859.

322.—George Henry Bayles, "*An improved indicator for registering the withdrawal of liquids from vessels.*" Feb. 4, 1859.

368.—George Bower, "*Improvements in apparatus for the manufacture of illuminating gas.*" Feb. 9, 1859.

413.—James Copcutt, "*Improvements in obtaining light from gases.*" Feb. 14, 1859.

441.—Samuel Thomas Cooper, "*Improvements in the use and application of artificial light.*" Feb. 17, 1859.

527.—John Leigh, "*Improvements in the purification of coal-gas.*" Feb. 28, 1859.

577.—Charles Roper Mead, "*Improvements in water gas-meters.*" March 4, 1859.

637.—John Court, "*An improvement in nibs for gas-burners.*" March 12, 1859.

742.—George Neal, "*Certain improvements in apparatus or fittings connected with the burning of gas for regulating and economizing its consumption.*" March 23, 1859.

875.—John Bindley and Joseph Leicester Hinks, "*Improvements in rotary steam-engines and pumps, a portion of which improvements may also be applied to the bearings of shafts or axles and other rotating bodies.*" April 8, 1859.

878.—Mark Antoine François Mennons, "*An improved articulated joint for water, gas, and steam-pipes.*" A communication. April 8, 1859.

886.—Thomas Spencer, "*Improvements in the economical treatment of refuse or waste matter containing sulphur.*" April 9, 1859.

911.—David Doig, "*Improvements in the construction of gas-lamps.*" A communication. April 12, 1859.

912.—Patrick Aitchison, "*Improvements in taps.*" April 12, 1859.

967.—José Luis, "*An improved machine for raising water.*" A communication. April 18, 1859.

1058.—Robert James Laing, "*Improvements in wet gas-meters.*" April 27, 1859.

1061.—Thomas Lacey, "*Improvements in gas-regulators.*" April 27, 1859.

1091.—Joseph Souquière (called Emile), "*A new or improved process for distilling coal.*" April 30, 1859.

1140.—Samuel Wright, "*An improved gas-governor or regulator.*" May 6, 1859.

1170.—Moss Defries, "*Improved apparatus for regulating the pressure of gas.*" May 10, 1859.

1174.—Michael Henry, "*Improvements in heating and in supplying air, and in the apparatus employed therein, part of which improvements is also applicable to exhausting fluids.*" May 10, 1859.

1187.—James Leadbetter, "*Improvements in pumps.*" May 11, 1859.

1224.—Alexandre René Landre, Polydore Gras, and Antoine Louis Auguste Boucherie, "*Distilling schist or Boghead-coal and other minerals for lighting.*" May 17, 1859.

1244.—George John Parfitt, "*Improvements in gas-burners.*" May 20, 1859.

1287.—James Harmer, "*Improvements in parts of dry gas-meters.*" May 25, 1859.

1308.—James Corn Bent, "*Improvements in gas-meters.*" May 26, 1859.

1374.—Richard Chrimes, "*Improvements in apparatus for supplying water to, and discharging the contents from urinals, wash-hand basins, and other similar articles.*" June 4, 1859.

1406.—Thomas Greenshields, "*Improvements in purifying gas, and obtaining ammoniacal and other salts.*" June 10, 1859.

1410.—Francis Puls, "*Improvements in the treatment of hydrocarbons.*" June 10, 1859.

1426.—Constantine Nicolaus Kottula, "*A means of cleansing or purifying the 'Thames.'*" June 13, 1859.

1442.—José Luis, "*A new siphon-meter for liquids.*" June 16, 1859.

1443.—José Luis, "*An apparatus for regulating individually the pressure, expenditure, and light in gas-burners.*" June 16, 1859.

1480.—Richard Laming, "*Improvements in purifying gas, and in obtaining and reproducing materials useful for that purpose.*" June 20, 1859.

PATENTS WHICH HAVE BECOME VOID

BY REASON OF THE NON-PAYMENT OF THE ADDITIONAL STAMP DUTY OF £100 BEFORE THE EXPIRATION OF THE SEVENTH YEAR.

170.—William Kilgour, "*An improved manufacture of naphtha, paraffin, and paraffin oil.*" Jan. 22, 1855.

367.—David Hulett, "*Improvements in apparatus for heating, cooking, and lighting by gas.*" Feb. 20, 1855.

466.—William George Henry Taunton, "*Improvements in pumps, pump-gear, and pump-buckets.*" March 2, 1855.

755.—Louis Ambroise Michel Mouchel, "*An improved method of joining pipes, tubes, and ducts.*" April 4, 1855.

Parliamentary Intelligence.

HOUSE OF LORDS.

Monday, June 16, 1862.

A petition was deposited against the Liverpool Corporation Water Bill, from owners of property and residents in Liverpool.

Tuesday, June 17.

The Aberdeen Police, Water, &c., Bill, was brought from the Commons, read a first time, and referred to the Examiners.

The Caterham Water-Works and the Reading and Reading Union Gas Companies Bills were returned from the Commons, agreed to, with amendments. The said amendments were considered, and agreed to.

The Wakefield Water Bill was returned from the Commons, agreed to, with amendments.

The Liverpool Corporation Water Bill was read a second time, and committed.

Thursday, June 19.

The Wakefield Water Bill.—The Commons amendments were considered, and agreed to.

The Liverpool Corporation Water Bill was referred to a Select Committee, consisting of the Earl of Macclesfield, Lord Polwarth, Lord Boston, Lord Delamere, and Lord Lyveden (chairman), who will sit on Tuesday, June 24, at eleven o'clock.

Monday, June 23.

The opposition to the Liverpool Corporation Water Bill was withdrawn, the previous orders discharged, and the Bill committed.

Five petitions was presented against the Highways Bill.

Thursday, June 26.

The Liverpool Corporation Water Bill was reported, without amendment.

HOUSE OF COMMONS.

Monday, June 16, 1862.

The Aberdeen Police, Water, &c., Bill, was read a third time, and passed.

The Caterham Water and the Wakefield Water Bills were read a third time, and passed, with amendments.

Police and Improvement (Scotland) Bill.—A petition was presented against the Bill from brassfounders, gas-meter and fitting manufacturers of Birmingham.

Tuesday, June 17.

The Reading and Reading Union Gas Companies Bill was read a third time, and passed.

Police and Improvement (Scotland) Bill.—Petitions were presented against the Bill from the secretary to the Shott's Iron Company, and brassfounders, gas-meter and fittings manufacturers of Edinburgh.

Tuesday, June 24.

Two petitions were presented against the Highways Bill.

Police and Improvement (Scotland) Bill.—Two petitions against the Bill were presented, from the Brechin Commissioners of Police, and the Newburgh Gas Company. The Bill was considered in committee; and, on clause 230, empowering the commissioners to undertake the supply of gas, being reached,

Sir John Ogilvy moved the insertion of words authorizing the commissioners to lease gas-works in "perpetuity."

The Lord Advocate said that, although he thought there were cases where these provisions would prove of use, he found there was so much objection to them, that it would be more convenient to leave them out. There was a very strong feeling on the subject, which it would be improper to disregard. There was also an objection in principle in allowing corporations to become traders in gas. There was some risk in concerns of that kind of abuse and mismanagement. He hoped, therefore, that his honourable friend would not press the amendment, but allow this and the following clauses on the same subject to be struck out.

Mr. Kinnaird agreed with the Lord Advocate, in thinking that it was desirable to omit the clauses. He had received strong remonstrances against it from his constituents.

Sir J. Ogilvy said he had been urged very warmly by the town council of Dundee to support this provision. There were no fewer than forty-eight towns in England, Scotland, and Ireland which already enjoyed the privilege which would be conferred by these clauses. Moreover, a Police Bill had been passed only the other day for Aberdeen, which contained clauses almost word for word the same as those which he adverted to. He was willing to omit the part of the provision authorizing town councils to become manufacturers of pipes.

Mr. Blackburn objected altogether to the proposal.

Colonel Sykes said that in Aberdeen it was the town council which had the power of supplying gas to the public. That was all very well; but he decidedly objected to the same power being bestowed on the commissioners.

Mr. Black protested against the clause, on the ground of the violent interference with the rights of property which it would involve. It might be very well to allow a town council to manufacture gas in a place where no gas supply previously existed; but, in the present measure, it was proposed that, in towns where a large amount of property had been invested in bringing gas within reach of the inhabitants, another body should step in, and, by a violent and unwarrantable interference, take the property out of the hands of those to whom it belonged. (Hear, hear.) There was another very serious objection to the proposal. It was provided in one of the clauses that there should be a special assessment not exceeding 9d. in the pound, besides all the other assessments, to carry out these gas powers. Well, in Edinburgh, there were many shops at a rental of £400 or £500 a year, the occupier of which would have to pay £4 or £5 for the gas which he consumed, and over and above that £15 for enabling another part of the community to get gas for next to nothing. In short, these clauses, were the most extraordinary he had ever heard of. It would be idle to attempt to cobble them. The only thing that could be done was to reject them *in toto*. (Hear, hear.)

Sir J. Ogilvy explained that no compulsory powers were given to deal with the property of gas companies. Any transactions of that sort would be left to private bargain.

Mr. Buchanan thought it would be a great benefit if powers were given to the commissioners to manufacture gas. In Glasgow, there was a great desire, he believed, that the corporations should acquire this power. There was good reason to believe, from a comparison of notes prevailing in different places, that the price of gas was higher than it ought to be. The main objection to the proposal seemed to be, that it was unadvisable to allow the corporations to trade; but, as they were allowed to supply the wants of the towns in regard to oil-lamps in the streets (for which they could supply their own servants and materials), he saw no reason why they should not be also permitted to supply gas. In Manchester, gas was provided by the corporation at a small cost, and a surplus was obtained from the manufacture which was applicable to public purposes. He hoped these permissive powers would be retained in the bill.

Mr. Craufurd considered the case of Manchester afforded one of the strongest evidences against the policy of allowing the corporation to supply gas. His honourable friend seemed to think that the result had been a cheap supply of gas. Now, what was the fact? The price at Manchester for a long time was 5s. per 1000 cubic feet, and that was a rate which enabled the corporation of Manchester to excuse from the public rates all those who did not burn gas; so that those who consumed gas paid for those who did not, and the surplus was applied to public improvements. At Liverpool, the price, during the same period, was 3s. 9d. The practical result had been, that whilst the people of Liverpool paid 3s. 9d., the people of Manchester had paid 5s.; and he believed the quality of the gas at Liverpool was much better than that at Manchester. It was true, the price at Manchester had been recently reduced to 4s., but for many years the charge had been much higher than at Liverpool. If the clauses had only provided that the corporation should have the power of lighting the public lamps, they would not have been objectionable; but he thought it highly inexpedient to make corporations trading bodies.

After some further conversation, a division was called for on the amendment proposed by Sir John Ogilvy; but, as a second teller could not be obtained, no division took place, and the clauses were struck out of the bill.

A BILL FOR THE SAFE-KEEPING OF PETROLEUM.

Preamble.

Whereas it is expedient to provide for the safe-keeping of Petroleum and certain products thereof that are dangerous to life and property, from their properties of giving off inflammable vapours at low temperatures, or of igniting on the application of light to their surfaces: Be it enacted by the Queen's Most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:

Interpretation Clause.

I. "Petroleum," for the purposes of this Act, shall include any product thereof that gives off an inflammable vapour at a temperature of less than one hundred degrees of Fahrenheit's thermometer:

"Borough" shall in England mean any place for the time being subject to the provisions of the Act of the session holden in the fifth and sixth years of King William the Fourth, chapter seventy-six, intituled "An Act to provide for the Regulation of Municipal Corporations in England and Wales;" and in Scotland any royal burgh and any of the burghs or towns returning or contributing to return Members to Parliament; and in Ireland any place for the time being subject to the provisions of the Act of the session holden in the third and fourth years of Her Majesty, chapter one hundred and eight, intituled "An Act for the Regulation of Municipal Corporations in Ireland:"

"Harbour" shall include any port, dock, navigable river, pier, or other works in or at which vessels ship or discharge goods or passengers:

"Harbour authority" shall include all persons or bodies of persons, corporate or unincorporate, being proprietors of or intrusted with the duty of improving, maintaining, or managing any harbour.

Regulations to be observed by a Ship carrying Petroleum.

II. Every vessel carrying a cargo consisting wholly or in part of petroleum on entering any harbour shall conform to such regulations in respect to the place at which she is to be moored as may from time to time be issued by the harbour authority having jurisdiction over such harbour. If any vessel is moored in any place in contravention of such regulations, the petroleum carried therein shall be forfeited, and the owner of the vessel shall incur a penalty not exceeding *twenty pounds* for each offence.

Regulations to be observed in storing Petroleum.

III. Not more than *twenty-five* gallons of petroleum shall be kept within *one hundred* yards of a dwelling-house or of a building in which goods are stored, except in pursuance of a licence given by such local authority as is hereinafter mentioned.

Any petroleum kept in contravention of this section shall be forfeited, and, in addition thereto, the occupier of the place in which such petroleum is kept, and the owner or person having the charge of the petroleum, shall each incur a penalty not exceeding *twenty pounds* a day for each day during which petroleum is kept in contravention of this Act.

Definition of Local Authority.

IV. The following bodies shall respectively be the local authority to grant licences under this Act in the districts hereinafter mentioned; (that is to say,)

1. In the City of London, except as hereinafter mentioned, the mayor, aldermen, and commons, by the council:
2. In any borough, except as hereinafter mentioned, the mayor, aldermen, and burgesses, by the council:
3. In any place, except as hereinafter mentioned, within the jurisdiction of any trustees or improvement commissioners, appointed under Act of Parliament, the trustees or commissioners:

4. In any harbour within the jurisdiction of a harbour authority, whether situate or not within the jurisdiction of any local authority hereinbefore mentioned, the harbour authority, to the exclusion of any other local authority.
5. In any place in which there is no local authority as hereinbefore defined, the justices in petty sessions assembled.

Mode of granting Licences.

V. Licences in pursuance of this Act may be granted under the hands of two or more of the persons constituting the local authority. There may be annexed to any licence under this Act any conditions which the local authority thinks necessary for diminishing the risk of damage from explosion or fire; and any licence violating any of the conditions of his licence shall be deemed to be an unlicensed person.

In case of refusal of Licence, the Applicant may memorialize Secretary of State.

VI. If, on any application for a licence under this Act, the local authority refuses to licence, or grants the same only on conditions with which the applicant is dissatisfied, the local authority shall, if required by the applicant, certify in writing under the hand or hands of one or more of the persons constituting the local authority the grounds on which it refused the licence or annexed conditions to the grant thereof, and shall deliver the certificate to the applicant, who may thereupon, within *ten* days from the time of the delivery thereof, transmit the same to one of Her Majesty's principal Secretaries of State, if the application is for a licence in England or Scotland, and to the Lord Lieutenant or other chief governor if the application is for a licence in Ireland, together with a memorial, praying that, notwithstanding such refusal, the licence may be granted, or that such conditions may not be imposed, or may be altered or modified in such manner and to such extent as may be set forth in such memorial; and it shall be lawful for the Secretary of State, Lord Lieutenant, or other chief governor, if he think fit, on consideration of such memorial and certificate, and if he think it necessary or desirable, after due inquiry from and a report by such person as he may appoint for that purpose, to grant the licence prayed for, either absolutely, or with such conditions as he thinks fit, or to alter or modify the conditions imposed by the local authority; and the licence so granted, or altered and modified, as the case may be, when certified under the hand of the said Secretary of State, Lord Lieutenant, or other chief governor, shall be to all intents as valid as if granted by the local authority.

Forfeitures and Penalties recoverable summarily.

VII. Any forfeiture or penalty for an offence against this Act may be enforced upon summary conviction before any two justices, or in Scotland before any sheriff; and *one moiety* of the forfeiture and penalty shall belong to Her Majesty, and the *other moiety* to the informer, unless the informer is a servant of the person informed against, in which case *the moiety* of the forfeiture or penalty which would otherwise belong to the informer shall be applied in such manner and to such other purposes as the justices or sheriff in their or his discretion may think fit.

Forfeitures and Penalties in Scotland may be levied by Poinding and Sale.

VIII. In Scotland forfeitures and penalties under this Act, and the expenses of conviction, may be levied and recovered by poinding and sale, and, in default of payment or of sufficient poinding, by imprisonment for any period not exceeding *three months*.

Search for Petroleum.

IX. Petroleum may be searched for in the same manner, under the same warrants, and subject to the same conditions in, under, and subject to which gunpowder may be searched for, in pursuance of the Act passed in the session holden in the twenty-third and twenty-fourth years of the reign of her present Majesty, chapter one hundred and thirty-nine; and all the provisions of the said Act relating to searching for gunpowder shall be construed as if the word "gunpowder" in such provisions included petroleum, as defined by this Act.

Reservation of previous Powers with respect to inflammable Substances.

X. All powers given by this Act shall be deemed to be in addition to and not in derogation of any other powers conferred on any local authority by Act of Parliament, law, or custom, and the local authority may exercise such other powers in the same manner as if this Act had not passed; and nothing in this Act contained shall be deemed to exempt any person from any penalty to which he would otherwise be subject in respect of a nuisance.

Legal Intelligence.

COURT OF QUEEN'S BENCH.

SATURDAY, JUNE 7.

(*Sittings in Banco.—Before Lord Chief Justice* COCKBURN, *and Justices* CROMPTON *and* BLACKBURN.)

REGINA *v.* THE TYNE IMPROVEMENT COMMISSIONERS.

Mr. MANISTY, Q.C., Mr. LIDDELL, and Mr. BRUCE, appeared for the appellants; and Mr. BOVILL, Q.C., Mr. WELSBY, and Mr. DAVISON, for the respondents.

In this case, the Tyne Improvement Commissioners were assessed to the relief of the poor for the township of Chirton, in respect of docks constructed by them, under an Act of Parliament, in that township, on a net rateable value of £10,000, and against several rates levied upon that assessment, they appealed to the quarter sessions of the county. Those appeals are still pending; and, in the meantime, the following special case was stated for the opinion of the court by an arbitrator. The Tyne Improvement Commissioners were incorporated and empowered by the River Tyne Improvement Act, 1850, 13 and 14 Vict., c. 63, amended and extended by the Tyne Improvement Act, 1852, 15 Vict., c. 110; the Tyne Improvement Act, 1857, 20 and 21 Vict., c. 71; and the Tyne Improvement Act, 1859, 22 and 23 Vict., c. 7; which several Acts, and with the several Acts therein respectively recited o referred to, or incorporated therewith, are to be taken as part of this case.

By the River Tyne Improvement Act, 1850, section 3, it was enacted that the Act be put in force within the limits of the port of Newcastle-upon-Tyne, which extend from Hedwin Streams above the borough of Newcastle-upon-Tyne to Spar Hawke in the sea, and comprise all streams, havens, creeks, bays, and inlets, between Hedwin Streams and Spar Hawke, within the flow and reflow of the tide, and situate within, or bounded by, the several parishes, townships, and places, therein mentioned, and, amongst others, the township of Chirton, in the county of Northumberland. By section 27 of the same Act, the commissioners were constituted the conservators of the port of the river Tyne, and the conservancy of the said port and river respectively was vested in the commissioners; and all rights, powers, privileges, and authorities whatsoever at the time of the commencement of the said Act vested, had, claimed, exercised, enjoyed, performed, imposed and obligatory, and which ought to be exercised, enjoyed, and performed respectively in, by and on the municipal corporation of Newcastle-upon-Tyne, by, under and by virtue of the therein-recited Acts, or any of them, and any grants and prescriptions, or otherwise howsoever with respect to the conservancy of the port and river, and the improvement, maintenance, and repair of the said port and river, and the quays, banks, and shores thereof, save so far as regarded rates, tolls, and dues, were vested in the commissioners as fully and effectually and in like manner as the same had been vested in and imposed and obligatory upon the said corporation.

Under and by virtue of the powers contained in the Tyne Improvement Act, 1852, the said commissioners made and established the Northumberland Dock, and executed and carried out divers works in connexion with and necessary for the formation and use of such dock; the dock being formed by inclosing part of the ancient land on the shore of the river Tyne, and purchased for that purpose by the commissioners from the Duke of Northumberland, and part of the river itself extending beyond low-water mark, and including part of a sand-bank dry at low water, lying between the low-water mark and the main channel of the river. Between this sand-bank and low-water mark was part of the bed of the river always covered with water. The inclosure had been formed by a double row of piles, driven to a considerable depth, between which the mud and sand have been scooped out, and the space packed with clay. An embankment of clay has then been placed against the piles, reaching their tops and sloping outwards on each side, the whole being covered with stone varying from 1 foot to 2 feet in thickness. The area thus inclosed has been excavated by means of a floating dredging-machine, in order to obtain the requisite depth of water for ships using the dock. In a portion of the dock this depth has not yet been reached. After the works are completed, it will always be necessary to continue the dredging to a certain extent, in order to remove the silt from time to time deposited in the dock and at the entrance.

By a poor-rate made on the 9th of December, 1859, the commissioners were rated to the relief of the poor for the township of Chirton in respect of the said Northumberland Dock, in a rate of 4d. in the pound on the net rateable value of £10,000. By another rate, made on the 19th of March, 1860, they were rated at 6d. in the pound on a like rateable value; and, by another rate, made on the 25th of June, 1860, at 6d. in the pound; and, by another rate, made on the 17th of December, 1860, at 6d. in the pound on the like rateable value. Against these several rates respectively the Tyne commissioners duly appealed to the court of quarter sessions for the county of Northumberland, which appeals have been from time to time respited, and are still pending. The parties have agreed that the rateable value of the dock shall be ascertained and affixed by taking the annual receipts of the commissioners in respect of the dock, and deducting therefrom the disbursements and all other proper allowances, and the following is a correct statement of the annual receipts and of the several amounts in respect of which deduction is to be made, subject to the opinion of the Court of Queen's Bench on the questions hereafter submitted:—

INCOME.			
Ship dues outward			£9,498 12 4
Ditto, inwards			58 13 5
Coal dues			10,934 5 2
			£20,491 10 11
River craft and sundries			196 1 10
			£20,687 12 9
DISBURSEMENTS.			
Law charges	£357 4 8		
Repairing dock-gates and entrances	500 0 0		
Maintaining river embankment	350 0 0		
Dredging	1,900 0 0		
Moorings	187 10 10		
Spoon Bay dredging	72 13 2		
1. Allowance for direction	500 0 0		
Salaries to engineer, secretaries, clerks and officers	700 0 0		
Salaries and wages to dock-master and men	1,665 3 4		
Dock stores	256 1 2		
Lighting	206 7 9		
Towage	497 18 6		
2. Watching	150 0 0		
Stationery and printing	67 13 9		
			7,409 13 2
Capital invested in moveable Plant.			
Dredger	£5,650 0 0		
Hopper barges	4,000 0 0		
3. Steamboat	1,200 0 0		
Cabins, landings, &c.	661 16 7		
	£11,511 16 7		
On which allow 5 per cent. interest, and 20 per cent. for tenants profits			2,877 19 1
And 3½ per cent. for depreciation			402 18 2
Capital for carrying on the Dock.			
4. Cash balance	£500 0 0		
5. Stores on hand	500 0 0		
	£1000 0 0		
On which allow 5 per cent. interest, and 20 per cent. for tenants profits			250 0 0
Capital invested in Fixed Plant.			
Dock gates	£12,583 14 6		
Moorings, capstans and dolphins	6,383 11 10		
Gas-pipes and lamps	1,344 8 8		
	£20,311 14 4		
Depreciation, viz.:—			
6. On the dock gates 2½ per cent			314 11 10
7. On the capstans, moorings, dolphins, gas-pipes and lamps, 3 per cent.			231 16 9
Capital invested in Freehold Plant.			
Dock, quay, walls and entrance masonry	£98,939 1 10		
River embankment	74,664 13 11		
	£173,603 15 9		
8. Depreciation on the masonry, 10 per cent			494 18 6
9. On the embankment, 1 per cent.			746 13 0
			£12,728 10 6
Income			£20,687 12 9
Disbursements			12,728 10 6
			£7,959 2 3
10. Deduct rates and taxes, 4s. in the pound, on a rateable value of £7959. 2s. 3d.			1,591 16 5
Net rateable value			£6,367 5 10

The differences between the parties arise on the items numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, 10.

1. The respondents object to a reduction for direction, contending that the dock is managed by commissioners appointed by or pursuant to Act of Parliament, and that such management forms part of their duties as Conservators of the Tyne, for the performance of which they are not entitled to remuneration. The appellants contend that the deduction is one which a tenant would be allowed to make as remuneration for his own time and trouble in managing the business of the dock, over and above a per centage upon capital and his trade profits.

2. The respondents object to any reduction for watching. There are no police nor watchmen attached to the dock. The appellants have an establishment of nine police-boats employed throughout their jurisdiction. One of these boats enters the dock each tide, and rows about the dock so long as the gates are open; with this exception, no watch is kept in the dock. There are but few goods exported or imported at the dock, and there are no warehouses. The captains and crews frequently leave their vessels in the dock, generally under the care of a ship-keeper, but occasionally with no one on board.

3. The respondents object to allow a deduction for a steamboat, the property of the appellants, which is used for towing the barges when filled with mud by the dredger, out to sea, where the mud is discharged, and for bringing them back, when empty, to the dredger.

The item of £497. 18s. 6d., under the head towage, is for the hire of steamboats to tow ships from the outer basin into the dock, and for moving them from one berth to another within the dock. The appellants do not tow ships into or out of the dock except from the outer basin. For towage within the dock or from the outer basin, no charge is made to the shipowner.

4. The respondents object to any allowance for cash, contending that, from the nature of the business, no cash would be required by a tenant. The revenue of the dock arises from coal-dues—about £250 per week—and for which six weeks credit is given; and from ship-dues—about £175 per week—paid weekly. The weekly outgoings are about £200, and consist of engineer's and dock-master's pay-bills for wages, stores, and other current expenses, but not tradesmen's accounts. At the end of the year 1859, the outstanding tradesmen's accounts were between £1300 and £1400, against which there was upwards of £900 owing to the dock on book-debts. In case the dock account is overdrawn at the banker's, interest is charged. The salary of the engineer is paid out of the general fund of the commissioners, a proportion being debited to the dock.

5. The respondents object to deduction for stores on hand. The item "Dock stores, £256. 1s. 2d.," is the amount of stores used at the dock in the course of the year. The appellants have, at Howden, on the river Tyne, some distance from the dock, a dépôt containing chains, ropes, buoys, timber, and other stores and materials for use throughout their jurisdiction. The amount of £500 under item 5 is to be taken as the proportion of these stores kept on hand for the dock.

6 and 7. The respondents object to these items of deduction. The disbursement of £500 under the head of "Repairing dock-gates and entrances," is for the ordinary repairs, besides which the appellants contend that a per centage on the capital should be allowed for extensive repairs and renovation in the course of time.

8 and 9. The respondents also object to the allowance of these deductions. The ordinary repairs of the entrances are included in the above-mentioned allowance of £500, but the appellants contend that a per centage on the cost of the masonry should be allowed for renovation. With respect to the river embankment, the deduction of £350 for maintenance is for labour and materials expended in keeping up the embankment when it may slip or be washed away, and for other external repairs; but, in the course of years, the piles will probably decay and require renewal, and other extensive repairs may become necessary. To meet these contingencies, the appellants claim the deduction of per centage on the cost of the embankment.

10. The respondents object to the deduction of rates and taxes on the gross rateable value of the dock, contending that such allowance should be made on the net rateable value after the rates and taxes themselves have been deducted. The above several points in difference are, therefore, submitted to the judgment of the court.

The court is to have power to order that all or any of the said items numbered 1, 2, 3, 4, 5, 6, 7, 8, 9, be struck out of the above statement, but not that the amount of any such items be altered, nor that any other alteration in the said statement be made except such as may be rendered necessary by the striking out of the said items or any of them, or by the decision of the court on the tenth point respecting the principle upon which the rates and taxes are to be deducted.

The parties have agreed that the court of quarter sessions shall have full power to alter, amend, or confirm the said rates in accordance with the finding of the Court of Queen's Bench.

Mr. Bovill, in arguing the case for the respondents said, the parish would not dispute the right of the commissioners to deduct the depreciation claimed in the 6th, 7th, 8th, and 9th items. As to the claim to deduct £500 for allowance for direction, that he submitted ought not to be allowed, because the commissioners were a public body, and had no remuneration nor any right thereto by the Acts under which they were appointed. In the Southampton Dock case (142 B. 595), it was held that the directors were entitled to remuneration, but they declined to accept it. In the Camberwell case (142 B. 571), a deduction in respect of remuneration to the auditors and directors of the Nunhead Cemetery Company was disallowed. If the claim to deduction in this case was upheld, then the expense of direction must be paid out of the profits, in respect of which a deduction had been already allowed. In reference to the second item in dispute—viz., the deduction of £150 for watching—that, he submitted, ought not to be allowed, because there were no police nor watchmen attached to the dock, and no distinct charge created by the watching. The commissioners, by the 27th section of the Tyne Improvement Act, 1852, had a police jurisdiction on the river within the limits of the port of Newcastle-on-Tyne; and they had established nine police-boats, one of which entered the dock at each tide, and rowed about the docks so long as the gates were open. By the 34th and 36th sections of the Act, it was provided that the police should not be paid out of the dock-fund, but out of the ship and boat duty, and the tonnage-rates. Thirdly, with respect to the deduction of £1200 for the steamboat used for towing the barges, when filled with mud by the dredger, out to sea and back, he submitted that the dock not being completed, the present use of the steamboat was for forming the dock, which increased its value. It was, in fact, only the expenditure of so much capital in the construction of the works; and there was already an allowance of £197 made for the towage of vessels. It was not shown that it was necessary to have this steamboat in order to earn the income of the dock. In the case of the Southampton Dock, where such an allowance was made, it was, in the ordinary course of navigation, necessary that they should have one. Then, as to the fourth excepted item, that of £500 as a deduction for cash-balance, the decision in the North Staffordshire case (30 L. J., 68 M. C.) showed that such an allowance should not be made. Fifthly, as to the deduction of £500 for stores on hand, that was objectionable. Dock-stores were charged in the claim for disbursements, and it was not found in the case that it was necessary to have such a supply of stores on hand. If the commissioners chose to do so for their own convenience, they were not entitled to claim a deduction in respect thereof. This item stood upon the same footing as that of the cash-balance.

Justice Blackburn said the question for consideration was, whether it was reasonably necessary for a tenant.

Mr. Bovill proceeded: The deduction of the rates and taxes on the gross rateable value of the dock was wrong; the decision in *Rex v. Hull Docks Company* (3 B & C, 516) establishing that the deduction should be made on the net rateable value after the rates and taxes themselves had been deducted.

Mr. Manisty, for the appellants, submitted that, for rating purposes, this case must be considered as any other commercial undertaking which was about to be let to a tenant, who would make all proper deductions in estimating the rent which he should pay.

Lord Chief Justice Cockburn said the court must assume that the tenant would have to manage the docks under precisely similar circumstances to the commissioners, having regard to these Acts of Parliament, and not on the footing of a commercial speculation.

Mr. Manisty said, the first claim for deduction was in respect of expenses of direction; and he submitted that the commissioners might take a reasonable sum for such expenses.

Justice Crompton asked whether turnpike-trustees could take money out of their trust-funds for such a purpose. Commissioners had certain statutory immunities, because they were public unpaid functionaries.

Justice Blackburn referred to the 48th section of the Commissioners Clauses Act, 1857, which is incorporated by section 5 of the Tyne Improvement Commissioners Act, 1850. This deduction was not to cover expenses; it was salary.

Mr. Manisty proceeded to the second item of deduction—the item for watching. This was a matter for the discretion of the commissioners, who were not bound to send one of the police-boats into the dock. The dock received the benefit of police superintendence, and ought to pay a reasonable charge for the same.

Justice Crompton said, the funds to meet such a charge were provided by the 30th, 34th, and 36th section of the Act of 1852.

Mr. Manisty said, the deduction for the steamboat was a reasonable charge upon the working expenses, as it appeared the boat was used for dredging the dock.

Lord Chief Justice Cockburn said, the question was, whether its services were necessary in the course of the construction of the dock, or were employed for dredging purposes?

Mr. Manisty said, the next item—£500 for cash balance—was not claimed twice over, and it was necessary to have such a balance where the income did not or might not meet the expenditure.

Lord Chief Justice Cockburn said, the deduction in respect of interest upon capital employed might include this in it, as lying idle for wages, &c.

Mr. Manisty said, as to the deduction for stores on hand, it was found that such stores were necessary, and the item was in the nature of cash locked up. In conclusion, he submitted that, in respect to the deduction for rates and taxes, such deductions had been allowed in similar cases.

The court intimated that the learned counsel for the respondents, in replying, need not argue as to the first and second items in dispute—viz., the deductions for direction and watching.

Mr. Welsby said, the third item was disposed of by the case itself, as it was found that the steamboat was now only used for works of construction, although, probably, hereafter it might be required for dredging purposes.

Lord Chief Justice Cockburn said it was not a matter for deduction while the steamboat was used for works of construction; but, if it became necessary for the permanent use of the dock, it would be in future rates.

Mr. Welsby submitted that the cash in hand and stores were not in the nature of extra capital, and as to the deduction in respect of rates and taxes, the net rent was that upon which the assessment was to be made. The principle of deduction was the same as that for depreciation.

Lord Chief Justice Cockburn, in delivering judgment said, all the questions had been disposed of in the course of the argument. The only one of a serious character was the one for expenses of direction. But this case was particularly free from difficulty on that head, for the whole purpose of the institution of the dock was of a public nature. The commissioners of their own free will took upon themselves the duties imposed by these Acts, without any right to remuneration, and if they took any it would be in violation of the Acts. By the Assessment Act, the court had to consider what rent an incoming tenant would give for the dock. It was the rule, as established by recent cases, that the imaginary tenant was to be treated as though placed in precisely the same position as the present occupier of the property. There might be circumstances in which the existing state of things would not be the test; but, in this case, there was no difficulty in this respect, for here no tenant could come into occupation of the dock except under the same circumstances. The imaginary tenant would start with the advantage of having the direction provided for him by the Statute without having to pay for it. As to the item for cash balance, the learned counsel for the respondents had satisfied him that there would only be a temporary delay in realizing the income for the first six weeks, and that after that there would be no necessity for having this cash balance so as to make it a ground of deduction. Then, as to the item in respect of rates and taxes, they would get into a difficulty if they were only to assess on the balance; and he was satisfied upon the argument that the deduction claimed ought not to be made.

The other judges concurred.

MARLBOROUGH STREET POLICE-COURT.

Wednesday, June 11.

(*Before Mr.* Tyrwhitt.)

EQUITABLE GAS COMPANY *v.* PROBERT.

The defendant, who resides at 13, Castle Street, Leicester Square, was summoned for non-payment of the balance of £4. 7s. 6d., due to the plaintiffs for gas supplied. The case came before the bench on a former occasion, when Mr. Walker, a solicitor who appeared for the defendant, took a preliminary objection to the jurisdiction of the magistrate.

Mr. D. D. Keane, instructed by Mr. Rogers, now appeared for the company; and contended that under the Equitable Gas Company's Act, 5 Vict., c. 36 (local and personal), sections 157 and 184, the police magistrate had jurisdiction in reference to all claims under £20.

Mr. Walker argued that the terms of the section referred to in a private Act could not be held to override the general provisions of the County Court Act, which established a distinct tribunal for the determination of all claims

of this nature, in which the amount was below the sum cognizable by the superior courts.

Mr. TYRWHITT said there was some difficulty in the case, owing to the bungling way in which the clauses of the Act of Parliament had been drawn, and he would take time to consider the point.

WEDNESDAY, JUNE 18.

Mr. TYRWHITT said he had taken the trouble to go carefully through the Acts of Parliament, and his impression was that the court did not possess the necessary jurisdiction, according to the construction of the 157th and the 184th sections. At the same time, he confessed that he was not at all positive on this point, because it appeared to him that the Act had been drawn in a most puzzling manner. It was impossible not to see, upon reading the sections to which he referred, that they were the reverse of being intelligible, and that they would require great consideration before arriving at a conclusive judgment upon them.

Mr. WALKER said, perhaps, under those circumstances, the best course for the magistrate to pursue would be to name some other day for taking the question.

Mr. TYRWHITT named that day week. He thought it was no wonder the gas company should have come before the court for a decision, seeing that the 157th section was so extremely puzzling. He expected to be able to enter into the merits of the case, with the view of ascertaining whether the gas-rent was due to the company, at the next hearing. Meanwhile, he hoped, if there was any counter claim against the company—any credit to be given by them in the transaction,—an account of that claim and credit would be rendered them.

Mr. WALKER said, that this had already been done.

Mr. TYRWHITT hoped, also, that if there was any real defect in the gas-meter it would be rectified at once by the company.

Mr. ROGERS promised to make a representation to that effect in the proper quarter.

The case was then further adjourned.

WEDNESDAY, JUNE 25.

Mr. TYRWHITT said, the question in dispute amounted to a sum of £4. 7s. 6d.; and, what he had said upon the last day was this, that a point respecting the jurisdiction of the court arose out of the construction of two of the Statutes. He was now of opinion that he had the necessary jurisdiction, and, therefore, the case came on fairly for hearing. He presumed the important point in it was, that Mr. Probert owed the company the sum of £4. 7s. 6d?

Mr. *Hurst:* Yes. That, your worship, is the really important point.

Mr. WALKER: Would you allow the meter to be brought into court, so that persons well-skilled in actual measurement might pronounce an opinion upon its qualities, for, I think, we shall be able to show that it is not in perfect order.

Mr. *Hurst:* The meter was put in on the 1st of February, and we know that at that time it was correct, because all meters are tested before they are put into the premises of any parties.

Mr. WALKER: We have sent to the meter-inspector on this subject, and our allegation is, that the meter is defective. The difficulty, however, in which we are placed is this, that we cannot remove it without authority. We, ourselves, have no power to do so. But, we are in a position to show that the measurement is not in accordance with the gas absolutely supplied.

Mr. TYRWHITT: That is to say, that they profess to furnish more gas than you actually consume?

Mr. WALKER: Yes; that they have put down figures over and above what we are in justice bound to pay for.

Mr. TYRWHITT: Then it will be part of your business to bring witnesses forward to prove that point. Meanwhile, we shall go on with the case.

Mr. *Hurst* was then examined. He said, the meter was fixed on the 1st of February, and it then had the inspector's stamp upon it. Its consumption was regularly marked on two or three occasions, and on the 31st of May it stood at 31,900. The company claims for 41,000 feet, being the quantity of gas consumed between the 30th of December 1861, and the 23d of May last. Charging for the 41,000 feet, and allowing for the deposit paid of £5, there remains a balance of £4. 7s. 6d. due. The defendant has been applied to for the money owing, and he says that he has paid some portion, which I believe he considers sufficient.

Cross-examined by Mr. WALKER: I have carefully calculated all the back rates. At the time that Mr. Probert entered into his agreement, I was not connected with the Equitable Gas Company: he was transferred from another company to the Equitable. I only called on him with reference to the amount owing to them. I left him a detailed account of the quantity of gas consumed, a copy of which I have with me. The £5 deposit was paid to us as security. At the time I presented the account, I demanded the full amount. We cut off the supply on Ladyday last. All our customers do not pay quarterly. I believe Mr. Probert paid one quarter under the other, but the inspector of the district will speak more particularly upon that subject. The receipt for the £5 is dated the 25th of February 1859. It is the first time of being supplied that a customer pays a deposit. When we get a new customer, we do not at all times make him pay a deposit. According to our books, I do not know that we gave Mr. Probert credit for £6. 9s. paid in February 1859. All I know is, that the £5 was a deposit, that £9. 7s. 6d. was due for the gas consumed up to the 23rd of May, and that all we got out of that was the £5.

Mr. TYRWHITT: It seems to me that the case is clear—perfectly clear.

Mr. WALKER: And it appears to me, upon the other hand, that there is a prejudice against my client.

Mr. TYRWHITT: There, you are wrong. There is no prejudice whatever.

Mr. *Henry Smith*: I am in the service of the Equitable Gas Company as inspector; and I inspected Mr. Probert's meter on February 1st, 1862. It stood at that time at 170,600. The balance against him would be then 3100 feet. On the 1st of February, there was a new one fixed at zero. I fixed that meter myself. Mr. Probert at that time complained of the insufficiency of the light we were giving him, and he wished for a better one. Therefore, the new meter was sent, and I have not seen it since. The meter then sent passed the meter-inspector's office, and it was stamped in the usual way.

Mr. TYRWHITT: Would it be possible for anybody to play tricks with a meter when once it has passed out of your possession?

Witness: It would not. The inspector's stamp is placed upon it, and it cannot very easily be tampered with.

Mr. *George Hemmington*: I am the manager of the Equitable Gas Company, and I inspected Mr. Probert's meter on March the 26th, and also on May the 8th. The meter stood then at 33,900.

Cross-examined by Mr. WALKER: I made the figures in the paper now shown me. I fixed the new meter on the 1st of February. It was a stamped one, and I fixed it quite correct.

Mr. WALKER: Can you tell me whether there are not sometimes inaccuracies made in putting down the figures on the cards?

Witness: It would be impossible for me to answer such a question.

Mr. TYRWHITT: You hold over the £5 as a sort of security for yourselves; in fact, it is a species of indemnity?

Witness: No doubt, your worship.

Mr. *Thomas Monday*, examined: I am a gas-fitter for the Equitable Gas Company, and examined Mr. Probert's meter on the 23rd of May, at the time we cut off the supply from him. The meter then stood against him 37,900 feet, but 17,100 was the amount charged for.

Cross-examined by Mr. WALKER: I do not produce the books with the debtor and creditor account between the company and Mr. Probert.

Mr. TYRWHITT: The books are no evidence in a case of this kind.

Cross-examination continued: I have no account with me of 44,100 feet; and I can only answer for the index I took at the time when I tested the meter. On March 26, the index was 20,800 feet. That was charged to Mr. Probert; and then the new meter was fixed. On May 23, it stood at 37,900, leaving 17,000 chargeable. Mr. Probert made no complaint to me about the meter, though I often saw him upon the premises. I saw him after we discontinued the gas, on the day previous to cutting it off; and he then said that if he did not pay on the following day, we should be quite at liberty to cut it off. He made no complaint whatever to me on that occasion about its insufficiency. I was with the collector on the day previous, and also on the day when the gas was discontinued. Mr. Probert then said—"I will meet this to-morrow at eleven o'clock." We waited for the payment not only until eleven, but until it was two; but the money never came. Mr. Hart went with me on that occasion.

Mr. *John Hart:* I am in the service of the Equitable Gas Company, as collector of gas-rents. I have not demanded £4. 7s. 6d. from Mr. Probert, but £5. 9s. 6d. The first application I made was about six weeks after the March quarter. He said he was not then prepared to pay. I afterwards sent him two notices, requesting payment within a given time. The second application is dated the 15th, and it requested payment on or before the 24th, saying that the gas would otherwise be discontinued, and naming the amount of the debt, £5. 9s. 6d. On the 22nd of May, I called on Mr. Probert. He then begged time until the next day, at noon, the 23rd. Not finding that the money was then forthcoming, I discontinued the gas.

Cross-examined by Mr. WALKER: I swear positively that I called on these various occasions for the £5. 9s. 6d. I asked for nothing more.

Mr. TYRWHITT: Can you explain how you now claim only £4. 9s. 6d.?

Witness: Yes. The account for gas due from March 25 up to May 23 is the difference between the £5 already paid, and it leaves only the £4 odd still due.

Mr. WALKER: Yes; but that would be presuming the gas-meter to be correct?

Witness: Of course.

Mr. WALKER submitted that the plaintiffs had failed, inasmuch as they had not brought the gas-meter into court. The defendant was prevented by the Act of Parliament from producing it; and, therefore, without being able to prove that it had not been tested at the inspector's office, and that its accuracy was unquestionable, the defendant was prejudiced. In point of fact, Mr. Probert was prevented by the law from showing to the court that he had not consumed the quantity of gas for which he was charged. He had paid, in the first instance, £6. 8s., and afterwards £5 to the company; and, had the secretary of the company been present with the books, it would be shown that the whole debtor and creditor account was clear, that the payment of these two sums was undeniable; that the defendant had paid in no other manner than quarterly; and that, at the time they cut off the gas, with the £5 they then had in hand, they were debtors to the defendant in the sum of 9s. 6d. The case was not that of a person running away, and evading a just debt; but it was, in fact, that of a man who, because his gas had been cut off, was compelled to burn a substitute.

Mr. TYRWHITT: I cannot entertain such a defence as this.

Mr. WALKER said, he should put the defendant into the box, who would prove beyond all doubt that he had always paid his gas-rent quarterly.

Mr. TYRWHITT: That may be; but was the money paid on the 22nd or 23rd of May?

Mr. WALKER said, the defendant had paid the £5 deposit, and voluntarily offered to do so, because the company's Act enabled them to demand half a year in advance. He submitted, as before, that, in the absence of the gas-meter, the defendant's case must be prejudiced, and that, if the inspector would test it on the premises, and then come forward and state the result, the whole case might be settled satisfactorily.

Mr. *Hemmington* observed, that the inspector could not test the meter upon the premises.

Mr. WALKER asked whether, under these circumstances, the magistrate would allow the accuracy of the meter to be tested at the inspector's office, before pronouncing a decision upon the case?

Mr. TYRWHITT replied in the negative. He said he would not be taken aback in this manner; and he requested that, if there were any witnesses for the defence, they might at once be called.

William Probert, the defendant, was then sworn. He said: On the 21st of February, 1859, I paid the sum of £6. 8s. to the Equitable Gas Company. I gave that amount for a quarter's gas.

Mr. TYRWHITT: There is no use in pursuing that line of examination, because the receipt is the evidence.

Examination continued: I have paid my rent to the company, quarter by quarter, up to the last quarter-day. I cannot tell the day when they made their application to me about this affair, but I know that, some time in May, I was asked for £5. 9s. 6d. I made no dispute about paying that amount. I called at the office to pay it, and I offered to pay them the amount at four o'clock the same afternoon. They said then that they had given orders to cut off the gas; and then they wanted £4 more for the forthcoming quarter. I objected at that time to the accuracy of the meter.

Mr. TYRWHITT said, the case was remarkably clear, namely—that £9 was owing, out of which £5 had been paid as a deposit. If Mr. Probert could have proved that the balance had been tendered, and that the gas had been cut off when nothing was due, then the matter would have assumed another complexion. But, as it was, it appeared to him that the gas company were not going for one single shilling more than they were entitled to recover. They had fairly and honourably given credit for the £5; and the defendant had all the satisfaction, if such it was, of knowing that he had given them a great deal of trouble and annoyance.

Mr. WALKER: Then your worship will not allow us to have the gas-meter tested?

Mr. TYRWHITT: There is one very plain answer to that question. Why did you not call the meter inspector here? If you could have proved defects in the meter, you could surely have called the inspector.

Mr. WALKER: But, then, according to the Act of Parliament, we could not take the meter off the defendant's premises.

Mr. TYRWHITT: Well, if you object to the meter, you have a right to see that its accuracy shall be looked into.

Mr. WALKER: Whatever the meter-inspector says we have a right to pay, we shall do so most willingly.

Mr. TYRWHITT: That will not do. I shall make an order for the money now due.

Mr. WALKER: Then we must appeal against your decision.

Mr. TYRWHITT: That you can do, of course, but such is my decision, and by that I will abide.

Miscellaneous News.

BAHIA GAS COMPANY, LIMITED.

The Second Annual Meeting of this Company was held at the Offices, Cloak Lane, City, on Tuesday, the 24th ult.—HENRY POWNALL, Esq., in the chair.

The SECRETARY (Mr. A. Clarke) read the notice convening the meeting, the minutes of the last court, and also the following report of the directors for the year ending 31st of March last:

In meeting the shareholders of the Bahia Gas Company (Limited), for the second time, the directors have much pleasure in reporting to them that they have commenced lighting the town of Bahia with gas.

In their former report, the directors expressed a hope that they might be able to commence lighting in December; but their anticipations were frustrated by difficulties and delays quite beyond their control. The most important of these were:—

First, the unusually long voyages made by our vessels. One vessel was 91 days at sea; another, which received our goods in November, did not arrive at Bahia till May; another, between the date of whose sailing and her goods being received at Bahia, was 4 months 15 days—the usual voyage being about 40 days. One of the vessels accomplished it in 31 days.

These irregularities in the delivery of the goods sadly interfered with the works; for vessels arrived out with materials which could in no way be made use of till the arrival of other goods that had left at an earlier date. During these voyages, also, the goods were injured and broken, entailing difficulty and loss of time in replacing them.

A further cause of delay was occasioned by the regulations adopted at the Custom House, whereby the company's goods, owing to their being admitted free of all duties, were only attended to three days in the week. These days being occasionally interfered with by festivals, so common in Bahia, the works suffered in proportion.

The change of President and Government officers also produced alterations in the arrangement of street-lamps, resulting, of course, in corresponding loss of time. To these must be added disastrous effects of very stormy and tempestuous weather in the harbour of Bahia, accompanied with unusual torrents of rain, impeding the works to a very serious extent, and producing sickness among our workmen at a time when their services were most required.

So great have been the difficulties, that the Government, well knowing the vigorous efforts made by the company to surmount them, readily allowed an extension of three months to light the number of lights mentioned in the contract, and have promised to assist us in every possible way.

His Excellency the President, and his officers, visited the works in March, and expressed satisfaction at the state the works were then in; and, in his speech at the opening of the Assembly, he thus expressed himself: "The works are progressing with the greatest activity, according to the report of the Government engineer; and it is expected that, in the beginning of May, the lighting up will commence."

The directors have appointed as manager a gentleman of practical experience in all matters relating to the manufacture of gas, and trust that under his management they may not only be able to secure the lighting of private houses, but also to conduct the works in a most economical manner.

The reports from him since his arrival are encouraging, and the applications as yet received for private lights speak well for the prospects of the company. We have sent out several gas-fitters, who are, with others, engaged at Bahia, fitting up the houses as quickly as possible.

The audited accounts will afford all information as to the financial position of the company.

The directors who retire by rotation are Messrs. M. H. Blount, A. A. Croll, and Erasmus Wilson. These gentlemen beg to offer themselves for re-election.

In closing the report, the directors, while they express their regret that the expectations of last year have not been fully realized, have good reason to believe that, when the works are complete, and in full operation, and all the difficulties incident to carrying out extensive works in a distant and foreign country shall have been overcome, the shareholders will have no occasion either to comment on the want of skill or energy on the part of those intrusted with the execution of the works, or the general results of the company's operations,

Dr. *Balance-Sheet, to March* 31, 1862. *Cr.*

To Proprietors capital, viz.:—4517 shares, issued at £20	£90,340	0	0		By Capital investment, viz.:			
Amount received thereon	80,736	0	0		Freehold land	£3,189	2	2
				£80,736 0 0	Building works	26,047	9	9
Arrears of call and capital uncalled	£9,604	0	0		Pipes	18,267	16	0
					Main-laying	9,227	3	11
Creditors, viz.:—					Fittings and sundries	1,211	5	0
Upon acceptances	£1,700	0	0					£57,942 16 10
Upon open accounts	3,252	0	2		Coal in stock and at sea			2,287 14 6
				4,952 0 2	Cash on deposit account with London Joint-Stock Bank	£6,000	0	0
Creditors—					Ditto on drawing account with ditto	957	17	6
Cartwright	£ 5	0	0		Petty cash	7	19	0
Rankin	1,573	11	2					6,965 16 6
Youle	2	14	5		Ditto advanced at Bahia			1,029 10 7
Aird	1,418	1	9		Office furniture			177 12 3
Bishop	23	10	0		Preliminary expenses—			
Lambert	141	1	2		Concession	£7,041	2	2
Sampson	2	9	8		Engineers services	4,250	0	0
Daum	20	0	0		Ditto expenses	393	19	4
Baker	30	0	0		Direction and audit	810	10	0
Sugg	35	12	0		Salaries	1,899	17	7
	£3,252	0	2		Commission	247	10	0
Bills payable	1,700	0	0		Advertising	224	4	0
	£4,952	0	2		Stationery and printing	111	3	4
					Law expenses	77	8	4
					Rent	180	0	0
					Travelling expenses	130	14	0
					Petty office expenses	128	9	0
								15,494 17 9
					Interest to shareholders on paid-up capital	£2,163	19	7
					Less interest received on deposits	374	7	10
								1,789 11 9
				£85,688 0 2				£85,688 0 2

Approved—by order of the board. HENRY POWNALL, *Chairman.*

The CHAIRMAN: Gentlemen, you will perceive from the report that we have not disguised from you the difficulties under which we have laboured, or withheld the expression of the disappointment which we have ourselves experienced in not being able, as we anticipated we should be last year, to light the town of Bahia in December. From the circumstances referred to in the report, delays have occurred which it was impossible to foresee or prevent. So satisfied have the Government been on that point, that taking, as I am happy to say they do, the deepest interest in the progress of the company, and visiting the works very frequently, they have readily extended the time allowed for the completion of those works for three months. It is very gratifying to us, and I am sure it must be so to the shareholders, to know that the execution of the works does not depend solely upon our approval. The provincial Government of Bahia have their own engineer, who has repeatedly visited the works and inspected them, and so satisfied was the President with his report that, when the Assembly of their Parliament met, he stated to them as you have already heard, that the works were progressing with the greatest activity, and that it was expected the lighting of the town would commence in the beginning of May. We are sorry to say that we have met with many drawbacks in the tempestuous weather, and the incessant rains, which have been unparalleled in Bahia during the past winter. We have also had difficulties arising from the illness of the European mechanics whom we sent out to do the work. However, we have secured the services of a very eminent medical man, an Englishman, there, and trust that our workmen will become acclimatized, and for the future escape some of those maladies to which Europeans are subject in that country. Although we were not able to begin lighting the town in December, as we anticipated, we had the satisfaction of lighting a part of Bahia in the month of May, and we expect by the next mail to receive the gratifying intelligence, that the lighting of the larger portion of the town is completed: under these circumstances, we have to direct your attention more to the future, which is hopeful, than to the past. We all know that in carrying out great undertakings, so far from the focus and moving power of your operations, many difficulties will present themselves; and, therefore, though the delays which we have experienced are very disappointing, they need not at all tend to discourage us. I trust they are now overcome, and that for the future we shall receive only such reports as will be gratifying to all those concerned in the undertaking. Our recent letters advise us not only of the commencement of the public lighting, but that there is an increased demand for private consumption by the inhabitants of Bahia. They begin to see the value of gas; and some of the principal hotels and other places of note are applying to be fitted up. We have sent out fitters who are quite competent to the work, with all the necessary appliances, so that we believe and hope we shall soon receive intelligence not only of the completion of the public lighting, but also that the demand for gas by private individuals is more in accordance with our wishes than we had at first reason to anticipate. The directors have also been occupied in finding out a suitable person to go to Bahia as the principal manager of the undertaking. You must be aware that it requires a person of great experience, no novice in the manufacture of gas; and he must be a person whose general ability and standing are such as to lead to confidence in his proceedings not only as to skill and energy, but as to integrity in the management of the affairs of the company. Such I hope will prove to be the case in the selection which the directors have made of Mr. Clark. The letters which we have had from him recently are very encouraging. He has laboured most assiduously, and has overcome the difficulties which storms and tempests presented to him; and we do anticipate, as I said before, that the next mail will relieve us from many of those doubts which we have entertained, owing to the delays which arose in the lighting up of the town. With regard to the accounts, you have them before you, and I shall be happy to answer any questions which you may have to put to us concerning them. I am not aware that I can say anything further to elucidate the position of the company beyond what I have done, and I will content myself, therefore, by moving the adoption and approval of the report.

Mr. COOKE, a director, seconded the motion, in doing which he said he did not think any observations from him were necessary as the chairman had gone a great deal into detail. He hoped that at the next meeting the report of the directors would be more satisfactory as to results, although he considered the present report was very encouraging.

Mr. MAUDE asked, whether the amount already expended on plant and works would be sufficient for the public lighting of Bahia? He assumed that the expense of fitting up private houses would be borne by the parties requiring gas; but it was important to know whether the works, as originally contemplated, would be carried out at a cost within the capital estimated. Another question he would like to have answered was—when the time for completing the lighting of Bahia expired?

Mr. ERASMUS WILSON replied, on the 12th of May, and the time was extended for three months.

The CHAIRMAN, in answer to further questions by the same proprietor, said it was intended to pay interest on the capital to the present time. It would be satisfactory to the meeting to know that the directors had no reason to suppose the estimates for completing the works would be exceeded. They had not issued the whole of the shares, and it was doubtful whether they would have occasion to do so. A portion of the money already expended—nearly £8000—would not come into the capital account ultimately, as it had

been expended in coals, payment of interest to proprietors, and other things, which would eventually be charged against revenue. The expense of mains, lamps, posts, &c., were not all included in the estimate; but the calls still due upon the shares already issued were more than sufficient to cover that balance.

Mr. CROLL (deputy-chairman) said he thought it would be better to take for granted, that, with the working capital, ultimately the whole £100,000 would be required. There would be something like £24,000 to pay to the contractors, including the sums already due. This, with the working capital, which would be certainly £7000 or £8000, would render it necessary ultimately to call up the whole £100,000. The estimates had been increased to a considerable extent, owing to the Government requiring the company to supply a larger number of lights than was originally contemplated. Of course, they paid for the additional lights at the contract price, which was very favourable.

The CHAIRMAN, in reply to Mr. F. Wilson, said the directors had not the slightest doubt that the public lighting contract would be completed within the additional three months accorded to the company. They did not apprehend that it would be at all necessary to raise money in any other way than by the issue of shares.

Mr. METHVEN said the appointment of a gas engineer at Bahia would necessarily increase the expenses of the company in that direction. He wished to know at what period those expenses were likely to cease?

Mr. H. P. STEPHENSON said the chairman would, perhaps, have the goodness to state at the same time what the present arrangements with the engineers were. In looking at the balance-sheet, it appeared to him to be 7½ per cent. upon the work done.

The CHAIRMAN said, it was 5 per cent. upon the capital.

Mr. CROLL said, the arrangement made with Mr. Blount was one, which, on account of the concession having been brought through him, the directors would not have entered into with any one else. That arrangement, from the commencement, had been 5 per cent. upon the capital, and for that sum he was to complete the works. Of course, a clerk of the works was paid in addition.

Mr. METHVEN said, he must not be understood as complaining of the rate at which the engineers were paid, but as they had now an efficient officer at Bahia, he would suggest to the directors that perhaps it might be wise to etermine the time at which the engineer's services should cease.

The CHAIRMAN said, the shareholders might rest assured that the board would not continue any expense beyond the period necessary. When the works were finally completed, they would then take the subject into consideration, as they were desirous to practise every economy consistent with the safety and well being of the company.

Mr. LAMBERT said, that Mr. Blount, having brought the concession, into the hands of the present company, was not exactly in the same position as an engineer who had taken it up as a matter of speculation. Knowing, as that gentleman must do, a great deal more of the affairs of the company than any one else, it must be to their advantage that he should still be retained.

The CHAIRMAN said, the directors would give the subject all the consideration it deserved. After the arrangement entered into at the first was completed, they would not feel bound to continue it: at the same time, as Mr. Blount knew the works so well they would not go to a stranger if they wanted additional help. He thought the proprietors might safely leave the matter with the directors to take such steps as they saw to be expedient.

Mr. MAUDE: Is Mr. Blount in Brazil now?

The CHAIRMAN: Mr. Law, his partner is.

Mr. F. WILSON: I see the capital in the balance-sheet is said to be 4517 shares issued at £20—£90,340.

Mr. CROLL: That is the amount issued.

Mr. F. WILSON: How many shares are there in hand?

Mr. CROLL: Four hundred and forty; but, a portion of these will be disposed of to the contractors in payments according to arrangement.

Mr. LETCHWORTH: When you say, "Arrears of call and capital uncalled," do you include the amount of the unissued shares?

The CHAIRMAN: No; it is altogether irrespective of that. It is the amount due upon shares already issued.

Mr. LETCHWORTH: You have in hand, according to the printed statement, £12,607—consisting of cash on deposit, £6000; cash on drawing accounts at bankers, £957; you have at Bahia £1000, and arrears of call £9604, minus the amount due to creditors £4952. What I want to know is, whether that sum will complete the works, or whether you will have to issue the remaining shares?

The CHAIRMAN: With the necessary working capital, no doubt the whole £100,000 will soon be absorbed; but, inasmuch as a portion of that will come back to us, we hope that £95,000 will be the total amount required. This account you observe is only made up to the 31st of March, and does not include the sums paid for coals, and interest, and several other things. You must not, therefore, assume that we have the £6000, and other amounts in hand. They exist now partly in coals, and partly in other things, paid for since that time.

Mr. MAUDE: What number of shares do the contractors take?

Mr. CROLL: The arrangement with Mr. Aird and Mr. Rankin is, that they shall take 25 per cent. in shares, and the rest in cash. The effect will be that nearly 200 of the remaining shares will be absorbed by them. The directors do not propose to issue the remainder until they really require to do so, as, with the cash in hand, and the calls unpaid, they are not pressed for money.

After some further conversation, the motion for the adoption of the report was put and carried.

On the motion of Mr. WHITING, seconded by Mr. PETRE, a vote of thanks to the directors for their services was unanimously agreed to.

The CHAIRMAN acknowledged the vote, and, in answer to Mr. Letchworth, said the price paid by the company for coals on board at Liverpool, was 17s.; the cost of freight, was 22s. 6d. per ton. They had now a stock of 2000 tons at Bahia, so that they were prepared against the contingency of the detention of vessels at sea.

Mr. CROLL, in reply to inquiries, said they were using the best cannel coal, and the gas supplied by them would be of double the illuminating power of that supplied in London at the present time.

On the motion of Mr. STEVENSON CLARKE, seconded by Mr. H. P. STEPHENSON, the retiring directors were severally re-elected.

Mr. LAMBERT, in seconding a vote of thanks to the engineers, secretary, and auditors, said, that from practical experience, he could testify that the engineer had exercised a great deal of judgment in the selection of the goods sent out, and a great deal of critical care in the examination of the accounts. He had on a former occasion remarked that, if every engineer was as skilful and energetic as Mr. Blount, shareholders would have good reason to be proud of them.

Mr. BLOUNT, in acknowledging the vote, said he had taken great interest in the works, and as shareholders both he and his partners had done everything in their power to serve the company.

The retiring auditors were re-elected, and a resolution was passed, authorizing the payment of interest to the proprietors, at the rate of 5 per cent. on the paid-up capital, until the 1st of July instant.

A vote of thanks to the chairman was then adopted, and this having been acknowledged the proceedings terminated.

METROPOLIS GAS SUPPLY.

CITY COURT OF SEWERS, GUILDHALL, TUESDAY, JUNE 17.

At the Meeting of the Commissioners held this day—Mr. DE JERSEY in the chair—an application was made by Messrs. Hadley, of the City Steam Flour-Mills, which stated that the applicants were about to manufacture gas upon a new principle for their own use, and they were desirous to obtain permission to lay down a pipe for the conveyance of the same to their premises in Earl Street.

Dr. ABRAHAM asked the members of the firm who attended to support the application, whether they could manufacture gas for the supply of the entire City?

The CHAIRMAN said that Mr. Hartley had informed him privately, that he hoped some day to beat the Great Central Gas Company.

Mr. WALTER inquired whether the gas proposed to be manufactured was coal-gas?

Mr. HADLEY: No; water-gas.

Mr. HAYWOOD: Does your gas smell?

Mr. HADLEY: It does smell, but not so strong or disagreeable as coal-gas.

On the motion of Dr. ABRAHAM, the application was referred to the General Purposes Committee, to examine and report.

THE CARBURETTING PROCESS.

Mr. Shepard (the managing director of the "United Kingdom Carburating Company, Limited) attended the court, and handed in the following letter, which was read by the assistant-clerk:—

To the Honourable the Commissioners of Sewers of the City of London.

Gentlemen,—On the part of the United Kingdom Carburating Company, Limited, I have to trouble you with the following application:—

It may be in your recollection that, by the terms of the contract entered into by this company with your court, our carburetting apparatus was to be fixed, by the 1st of February last, to the street-lamps included in the contract, being 1760 in number.

The contract, owing to some delay for which our company was not responsible, was not sealed until the 24th of January last, so that it was utterly impossible for us to have the apparatus ready in time; and we were informed that this term of the contract would not be insisted on.

Every effort has been made, on the part of the company, to have the apparatus fixed to the lamps included in the contract without the least delay; and, although our company could not commence making the apparatuses until the contract was sealed, upwards of 1200 carburators were fixed by the 30th of April with the 3-feet burners, in addition to 400 carburators, which were attached to the column-lamps, as after referred to, and the whole number was completed on the 1st of June.

I must also state that our company have been put to great and needless expense in fixing their apparatus, as well as extra cost, by the proceedings of the Great Central Gas Consumers Company; and that, had it not been for such obstruction, our contract would have been completed by the 30th of April.

The officers of the gas company had notice when we were fixing the apparatuses, and stood by until 400 carburators had been fixed, under the inspection of their servants, to column-lamps, and then complained that they had not taps attached to them, which the company then, for the first time, insisted on, and which obliged us to take this number of carburators down and refix them—the company insisting that we should place taps under the carburators; and that, if we did not do so, they would cut off the gas from the lamps.

Again, after 300 or 400 apparatuses to bracket-lamps had been fixed, the gas company objected that their taps were placed too close to our carburators to enable their men to turn them with ease, and required them also to be taken down and refixed.

So that our company have had about 700 carburators to take down and refix, to satisfy the caprice of the gas company; and, in many instances, we have had considerable expense, to place four new supports to each column, to hold the lamp higher, so as to allow of room for a tap under the carburators.

In addition to this, our company has been put to very great expense, as well as delay, in providing and fitting fresh copper piping, elbows, and unions, to upwards of 500 of the bracket-lamps, in consequence of the rotten condition of the old piping, which would not admit of our new piping being attached to it, and which extra expense was not contemplated, nor included in the contract.

The apparatuses have now, however, been attached for some time, as above stated, and, I believe, are giving every satisfaction where we are receiving the stipulated 3 feet of gas, as well as effecting a considerable reduction to the ratepayers in the cost of gas.

I, therefore, on behalf of our company, have to apply to your honourable board, to relax that part of our contract which provides for the fixing of the apparatuses by the 1st of February, and to accept our performance of it as the best in our power under the circumstances, and in discharge of this part of our contract; and to direct that our time shall run from the date at which the carburators were fixed.—I have, &c.,

4, *Victoria Street, Westminster.* (Signed) E. C. SHEPARD.

The CHAIRMAN said, he thought the most convenient course would have been for the Carburating Company to make application to the General Purposes Committee, to whom this matter was referred, and who had already had a great deal of discussion upon it. On a former occasion, complaints had been made, which were entirely contradicted by the gas company; and it was very undesirable to discuss an *ex parte* statement like this in open court.

The letter was referred to the committee.

Mr. SAUNDERS asked whether the inspectors had reported that the gas companies were opening the pavement at the foot of the pillar-lamps, and doing something to the pipes, at night, during the time the gas was burning? He alluded to the late gas explosion in Shoreditch, and said he thought it was rather a dangerous practice. He was passing through Cheapside at nine o'clock on the previous night, and noticed no less than three openings in the pavement.

Mr. C. YOUNG said, there were no less than 35 openings; and, on Inspector Mortimer being called in, he said he had noticed it, and the men were filling up the holes as they went on. They were cutting off old service-pipes.

Mr. SAUNDERS did not mean that. He thought the course now being pursued was very dangerous, as, if an escape of gas were to take place, and communicate with the light above, an explosion might be the consequence. He thought it worth while for the inspector to warn the companies that, if, in consequence of these openings being made while there was a light about, an explosion did take place, they, and not the commission, would be answerable.

Mr. YOUNG said, he had observed that they had taken some of the paving-stones up with a crowbar, and asked the inspector how many they had broken?

Inspector MORTIMER said, he did not know; but he had noticed that they had put down new stones in several places.

The matter then dropped.

TUESDAY, JUNE 24.

Mr. Chaplin, a member of the Court of Common Council, attended with Mr. Norman, of Little Britain, to complain of the defective lighting of the

public lamps in that locality. They stated that their complaint referred only to those lamps which had the carburators attached, the light from which was almost always very feeble, and frequently went out altogether. Mr. Norman stated that this had occurred five or six times during the last month. Towards eleven o'clock at night the flame became very feeble, and gradually became extinguished. He had called the attention of the police and the lamplighter to it, and the latter informed him that the complaint had been reported to the gas company.

Mr. Chaplin said, the subject had been brought under the notice of the vestry of St. Botolph, Aldersgate, and they had passed a resolution to make a representation of the case to this court.

Dr. Abraham inquired whether there was any complaint in the neighbourhood of an insufficient supply of gas for private consumption?

Mr. Norman said, he had not heard of any. He might mention that the smell of the naphtha used in the public lamps was very offensive. There was a bracket-lamp attached to his house very near to the window of his best sitting-room, which was not often used. On going into that room after it had been shut up for a day, he found that the smell of naphtha was disagreeably predominant, and it seemed as though a French polisher must be at work in the vicinity. He had never experienced such an annoyance before the adoption of the carburetting process. In fact, it was now impossible to have the windows opened.

Mr. Chaplin said, complaints had been made to the lamplighter, that the defective lighting of the public lamps made the neighbourhood dangerous at night. The lamplighter said he could make the light burn brighter, and accordingly took off the carburator, and gave it a shake. After that, there was a better light for a night or two.

Mr. C. Young thought the matter ought to go to the General Purposes Committee, and moved a resolution referring it to them for consideration.

Dr. Abraham seconded the motion, and said the cause of complaint was not the use of the carburator, but the reduction of pressure in the gas after a certain period of the night. He believed that the practice adopted by the gas company of reducing the pressure led to serious inconvenience, and the case he mentioned a short time since of the light going out in his house, and the gas escaping during his absence, showed that the practice was attended with danger, also. Many persons burned gas all night in the hall; and, as the gas company diminished the pressure at a late hour, the light frequently went out, and the gas continued to escape in sufficient quantities to render an explosion possible after a short time. He believed that many fires, the origin of which was considered unaccountable, might be due to this circumstance.

Mr. Fricker said, the public was suffering great inconvenience because the two companies were acting in opposition. A short time ago, the representative of the gas company informed them that their men never interfered with the carburators in any way, but he (Mr. Fricker) knew for a fact that that statement was not correct. Passing through Leadenhall Market, he had seen the gas company's man cleaning the lamp while the carburator was removed, and left on the pavement, and some little boys were playing with it. Until the two companies could be got to pull together better, such complaints as they had had to-day would be constantly arising.

The motion was then put and carried.

The Clerk read a letter from the Great Central Gas Company, stating that, in 39 cases out of 40 in which complaints were made of defective lighting in the public lamps, there was an abundant supply of gas on the removal of the carburators. In five other cases, the gas had gone out, from some unknown cause, after being lighted in the regular way.

Mr. Haywood said, some time ago, there was an understanding with the gas company that additional men should be employed to go round during the night, and relight the extinguished lamps.

After some conversation on the subject, it was resolved to refer the matter to the committee.

Inspector Williams reported that the Great Central Gas Company had closed the carriage-way of Aldgate, for the purpose of laying down a 3-feet main.

Deputy Whiteside, the representative of the ward, said he hoped the inconvenience occasioned by this work would not be of long continuance.

The Chairman said he doubted whether the company had power to stop up the street in the way they had done.

This subject also was referred to the committee.

St. Olave's District Board of Works, Tuesday, June 17.

The Gas Contract Committee reported on the offer of the Surrey Consumers Gas Company to supply gas to each lamp for £4. 15s., to include lighting, extinguishing, and cleansing, and declining to mention any price for the supply of gas only. The committee did not recommend the board to discontinue lighting, extinguishing, and cleansing their own lamps, that plan having been found to work beneficially. The committee, finding that many towns had gas supplied to their public lamps by meter, a letter was written to the company on the 8th of May, asking upon what terms they would supply gas to the public lamps by meter. A reply was received on the 10th, stating that the price would be 4s. 6d. per 1000 cubic feet, the board to provide meters. Another letter was written by the clerk, asking whether the 4s. 6d. included lighting, extinguishing, and cleansing; and as to what would be the terms for supplying gas only. The reply to this, on the same day, the 12th, said the price named was for gas only. On the 15th, the company was asked how many meters they would require to be provided, as in many cases a proportion of meters was considered enough for a specified number of lamps, and whether they would rent meters to the board. On the 30th, the gas company declined to provide meters; the directors also stating that they were not to be bound by the practice of any provincial town, as to allowing one meter to regulate the consumption of gas by a number of lamps. They were, however, prepared to meet the board, and to lower their tender from £4. 15s. to £4. 5s. per lamp, including lighting, extinguishing, and cleansing. The clerk wrote again the next day, stating that no answer had been given as to the number of meters required. The company wrote on the 2nd of June, saying they would not be satisfied unless a meter was fixed to each lamp. The committee had no doubt, from the above correspondence, that ultimately the matter would have to be settled by arbitration. To do this might, perhaps, cause some temporary inconvenience, but this was to be expected, as this would be the first attempt in the metropolis to light the public lamps by meter, which mode they considered the most equitable method. In some towns, one meter was found sufficient to regulate the consumption of 70 lamps, and in other towns, there was one meter to every 12 lamps. In relation to the present contract, the lamps were burning from sunset to sunrise, which would be for 4308 hours during the year, and a consumption of 5 cubic feet per lamp per hour would give for each lamp 21,540 feet on the consumption for the year. The price now tendered was £4. 5s., from which, if they deducted 15s., the cost of lighting, &c., as estimated by the company, the net price charged for the gas was £3. 10s., or 3s. 3d. per 1000 cubic feet, as against 4s. 6d. demanded if the gas was burned by meter. The committee recommended the board to light the public lamps by meter, and to offer the company 3s. 3d. per 1000 cubic feet, one meter to regulate the supply to every 12 lamps; and that the matter should be referred to arbitration in case the company declined to accept the offer.

Mr. Cameron moved the adoption of the report, and thought great credit was due to Thomas Walker and Co., for the report, for it was one of the best he had ever heard. He was surprised at the attempt, on the part of the company, to extort money from the board.

Mr. Walker seconded the motion, observing that the board, showing they were not helpless, brought the proposition to supply gas at a reduction of 10s. from their contract price. As to the effrontery of charging 4s. 6d., already under their contract, they were supplying it at 4s. under the railway arches. As to a meter to each lamp, under the arches there was a meter to 15 lamps, and each meter regulated that number of lamps. In places burning by meter, the lowest number of lamps to a meter was 12, and the highest 70. The committee had put the number at 12. The company attempted to extort from the public consumer what they had no right to ask for. The private consumer sometimes never paid at all, and there was always collector's poundage, &c., to pay. The board paid their money in one lump, and there was no bad debt. In Reading, the public consumer paid 3s. 7d., and the private 5s. The committee recommended 3s. 3d., and, the company declining that, they must go to arbitration. By adopting this course, not only would £230 be saved, which the company was trying to saddle on the board, but £300 or £400 besides. This mode of burning gas would be found to be the most equitable mode of dealing with the company. When gas was burned by meter, every means of economizing light would be adopted.

Mr. Shand stated that, in Bermondsey, the price was £4. 5s. for supplying gas, lighting, extinguishing, and painting.

The motion was put and carried, and the committee were instructed to carry out the recommendation contained in their report.

READING GAS SUPPLY.

At a Meeting of the Local Board, held on the 19th ult., the following report from the Special Gas Committee was unanimously adopted:—

Your committee have to inform your board that, in compliance with the resolution adopted by your board at your last meeting, your committee have proceeded to consider the necessary preliminary arrangements for lighting the public lamps after the 1st of September next, according to the new Act of Parliament.

In executing the duty thus intrusted to them, your committee felt it very desirable to confer with Mr. Samuel Hughes, the engineer, whose assistance and advice contributed so much to the successful prosecution of the recent negotiations with the companies, and the satisfactory adjustment of the provisions of the new Act of Parliament. An appointment was accordingly obtained with Mr. Hughes, who recently attended in Reading, in order to meet your committee to confer with, and advise them on the various matters to be attended to in completing these arrangements. After an interview of several hours, the following preliminary resolutions were adopted by your committee:—

1. "That the board do burn by meter, and that there be a meter affixed to one lamp in every twelve lamps, being the maximum number which the company can require under the new Act."

2. "That the board do undertake to light and extinguish the public lamps."

3. "That the board do forthwith fix a registering pressure-gauge, in order to obtain a record of the pressures which prevail in the mains of each company; that Mr. Hughes do procure at once two pressure-registers for this purpose, and that the situations for fixing the same be arranged by Mr. Hughes, and the officers of the companies."

4. "That the committee approve, for use for the lamps of your board, of the stop-cock and tap, a drawing of which Mr. Hughes submitted to the committee, and that the same be submitted to the companies for approval."

5. "Mr. Hughes, having informed the committee that lamp-posts could be made so as to admit of the meter being fixed within them, he was instructed to prepare, and forward to the clerk, a drawing of such proposed lamp-post; that if ultimately approved, the new lamp-posts about to be made for the board might be constructed accordingly."

Your committee, having come to these resolutions, and discussed with Mr. Hughes a variety of matters connected with the lighting of the public lamps, it was arranged that Mr. Hughes should meet the committee again on Tuesday, the 24th inst., at twelve o'clock, and that a deputation from the gas directors should be invited to meet the committee and Mr. Hughes on that occasion, as your committee hope that by this step, the preliminary arrangements for lighting the public lamps, under the new Act may be completed between the board and the companies in an easy and satisfactory manner to all parties.

METROPOLITAN BOARD OF WORKS.

Friday, June 20.

DISCHARGE OF GAS-TAR INTO THE THAMES.

At the Weekly Meeting of the Board, held this day—Mr. H. L. Taylor in the chair—the following report was presented by Mr. Bazalgette, on a letter from the Thames Conservators, with reference to the discharge of gas-tar from the respective premises of Messrs. Harrison, Burgess, and Hessell, into a sewer which empties itself into the river Thames, near the Commercial Dock Pier:—

June 18, 1862.

I beg to report that an examination into this complaint has been made, and it is found that the discharge from the three factories named is not directly into a main sewer under the jurisdiction of this board, but is into a local sewer under the control of the Greenwich District Board, which ultimately discharges into the main Earl sewer, into which the refuse from the Messrs. Catchpole's grease-factory is also discharged direct. There is also a direct discharge from the creosote-factories of Messrs. Gabriel and Son, and Messrs. Burt and Co. into the Rotherhithe Pier main sewer. I, therefore, recommend that this board serve Messrs. Catchpole, Gabriel, and Burt, with notices to discontinue the discharge, and cut off the connexions of their respective premises with the main sewers; and that the Greenwich District Board be informed of the complaint made by the Thames Conservators, in order that that board may take similar steps, to prevent the further continued discharge into their sewer of the refuse from the three factories referred to in Captain Burstall's letter.

I further recommend that the Thames Conservators be informed of the steps proposed to be taken to abolish the nuisance referred to.

The report was adopted.

MR. FLINTOFF AT CARDIFF.

[From the *Cardiff and Merthyr Guardian.*]

Since our last publication two meetings have been held at the town-hall, with the object of securing gas at greatly reduced prices from the present scale. A person named Mr. Flintoff, whose trade it is to agitate, attended as at the other meetings, and denounced what he was pleased to call monopoly, whilst his audiences, evidently suffering from the fever of intense excitement, laughed, beat the ground and the benches with walking-sticks and umbrellas, and cried "Hear, hear!" as loud as their lungs would permit. Such has, thus far, been the character of the assemblies, which have been composed chiefly of small tradesmen and mechanics. In our last, we reported that Mr. Flintoff and his colleagues were to meet last Friday evening to publicly announce the result of a letter sent to the Cardiff Gas Light and Coke Company, asking for reduced rates. The party assembled accordingly,

when it was stated that the manager had promised the communication should be laid before the directors at the next half-yearly meeting. The agitator was exasperated, Mr. Twigg's expectations were not realized, and the audience were surprised that the threats of establishing a new company had not been heeded. Mr. Flintoff said the aggrieved party had now only one course open, if gas at a reasonable rate was desired, and that was to set about at once for the formation of a new association. His listeners cheered and dispersed—some full of hope, others, on whose physiognomies were unmistakeably painted "grim doubt." On Saturday, the gas company printed a circular, showing the prices at many other towns like Cardiff, and giving the public an idea of the "benefits" rendered by Mr. Flintoff elsewhere, leaving them to draw their own conclusions. The "opposition" were astounded at its contents, and regarded their chief with a sort of suspicion. Another meeting was published for Wednesday night last, when the "assertions would be refuted." In the interval, the manners and customs at parliamentary elections have been cherished, anonymous squibs having been freely distributed throughout the town. Of course, both sides were represented. We have not the slightest sympathy for this exhibition of foolishness; at the same time we like to see the writers keep in memory the great desideratum—common decency. It is but fair to state that what has been circulated on behalf of the company has been of a truthful character, however "cutting" the remarks may have been, but "Mr. Twigg's party" overstepped the boundary of every sense of propriety. The insinuating filthy observations, devoid of one particle of wit, stamped the dictator and penman as men of the most grovelling dispositions, and had a material tendency to lower, in the mind of every respectable inhabitant of the town, the promoters of the scheme. Without writing more upon this, the most despicable piece of composition ever issued from the press, let us proceed to briefly notice the meeting held on Wednesday evening. Mr. Richard Cory, junr., occupied the chair, and said "Monopoly was a thing of the past," upon hearing which the people seemed satisfied. Mr. Mr. Flintiff spoke in strong terms of the placards which had been issued, as he said, "by the monopolists." The speaker worked himself almost into a state of frenzy, and denounced those who would parade the private affairs of men, in an anonymous manner, as "the most despicable beings, and the greatest blackguards." If the speaker and his colleagues are possessed of consciences, the remarks must have rather pricked them, for "the champion" spoke as though they were as "innocent as lambs," and had never seen a copy of the most detestable and low "attempt at a hit" that was ever paraded befor the public vision, and which was the production of the "respectable" opposition. All within the hall must have been aware that the agitator was making too glaring an omission from the list of the condemned to be counted as accidental. All lovers of fair play and honesty must acknowledge that, if Mr. Flintoff chose to hold up to ridicule men who would condescend to anonymous squibs on the one hand, he had a right to equally display his bullying propensities to his own clique. We are not the apologists of the Cardiff Gaslight and Coke Company, but we speak thus strongly because we are anxious to see in all public matters a regard for the laws of impartiality and sound discretion. The agitator claimed the distinction of a "champion of progressive truth;" but, in his excited condition, he perhaps said a little more than he intended when informing his audience a little further on that "he came to Cardiff to propound views by which he lived." He said, "he was brought to the town, and he expected to be paid for what he did. It was no matter to him (these are his own words) whether the scheme in which he was engaged prospered or not. *He had no interest* in it, further than that he came to set forth the truth, and to show the people that they were victims of a monopoly, and he would do his best." He accused the JOURNAL OF GAS LIGHTING, from which the Cardiff Gas Company had quoted, of falsehood and partiality, and said the paper was printed merely to serve the interests of monopolists. Notwithstanding his display of *eloquence*, he failed to put even a decent colouring on the *Whitehaven case*, and it was evident that the remarks which had been issued were "about the thing." He spoke of shareholders selling their shares to capitalists, who sacrificed eventually the public interest, and patched together a lot of other rambling sentences, which proved nothing beyond that the new company in Whitehaven had proved a miserable failure. He wished his hearers to understand it would be found that at nearly all the places where gas was at a higher rate than at Cardiff, the cause was defective engineering, and he was bold enough to predict for a new company at our town, a dividend of 7½ per cent. on 2s. per 1000 cubic feet. As to an Act of Parliament being granted, he had not the shadow of a doubt, but studiously avoided to tell the people how much cash they would have to pull out to accomplish that, under the calmest circumstances, much less when an opposition would have to be faced. But it must be taken for granted, as Mr. Flintoff said, that the people of Cardiff, who are not satisfied, have "sparet enough and pluck enough" to meet the exigencies of the case. What was wanted was £5000 subscribed, and then they would be enabled to sell gas at 2s. per 1000 feet and have a dividend of 7½ per cent. Such was his calculation, and the people cheered to think that he could tell such a comfortable *story*. Working expenses he counted as a mere nothing, and doubted not but that "the new fangled party" would lead the corporation and the Board of Health in a string at the pleasure of the amateur drivers. What a thought for an aspiring tinker, a tap-room proprietor, or a cheap Jack, to be leaders in the borough! Well might they cheer their stimulator, and fancy-painting expounder! It was natural. At the conclusion of the "Great address," and after the "powerful arguments had been spent," Mr. R. Cory expressed the pleasure that had been afforded him, and felt little doubt but that some gentlemen would propose a vote of thanks to Mr. Twigg and Mr. Flintoff. One was proposed but never seconded for Mr. Twigg, whilst the "great gun" had to be contented without one. Thus ended the "evening's entertainment." Not for a moment do we raise a voice against cheap gas, but against the manner in which it is advocated. We must also confess that we cannot see any hope for return on capital *if* a new company was organized. Let the excited followers of Flintoff consider, before attaching their names to an official document, that they will have to dip pretty freely into their pockets to maintain a parliamentary contest, which very probably may leave them in the lurch; that they will have to pay treble what their adviser asserts will suffice for office expenses, than they now willingly imagine; and that, *if* they *do* get the sanction of the Legislature, they will have to stand against a competition in the price of gas which will shiver their dividends—or, perhaps, more correctly speaking, their supposed dividends—into atoms. Those who know anything of the gentlemen who compose the present company, and who have an idea of the wealth which is available, cannot shut their eyes to the fact that they are ready to completely turn the scale upon a comparatively feeble opposition, by a most determined and long-continued competition in the price of light. We are quite ready to believe that some reduction in the present scale might be made, and submit that there ought to be one uniform rate of charges. We are not, like Mr. Flintoff, going to style ourselves "gas engineers," but we are, nevertheless, under the impression that the expense of supplying the large and the small consumers is the same. The argument that some consideration ought to be manifested to the man who pays a large account annually for gas, is really no argument at all. The large consumers use a large quantity, because circumstances require the consumption. However, we do not propose to go further into the question, believing that the present gas company are quite willing to consider the matter, and ready, now that their funds will allow, to give the public the benefit of a reduction. But, as we anticipated, the bullying of the new-fangled opposition has deservedly had no weight with the directors, and Radical conduct has been once more treated with contempt. Mr. Flintoff assured his hearers, on Wednesday evening, that the furnishers of capital would one day have cause to rejoice that they were ever led by him to embark in the undertaking, but we venture to predict that, if the unrefined agitator returns to the place from whence he came—if the people heed not his "glowing anticipations," and keep their financial stock in its present keeping—and if they decline further to subscribe towards feeding their "orator," they will have to thank us for having thrown out the hint, and their own good sense for having accepted it.

MEMORANDA ON ELECTRIC LIGHTS.

By J. K. WHILLDIN, C.E.

[From the *Journal of the Franklin Institute.*]

In the autumn of 1861, Professor Way visited this country, and made several exhibitions of his electric light. The varieties of apparatus which he has employed display much skill and ingenuity.

During the professor's sojourn in Washington, the attention of the Light-house Board was directed to this light; and, through the instrumentality of Professor Joseph Henry, and the energetic secretary of the board, Commander T. A. Jenkins, U. S. N., arrangements were made to exhibit it from Fort Washington, which can be seen from the presidential mansion, and is distant in a direct line about 13 miles.

Accordingly, on Monday, Sept. 23, a small party, which the writer had the pleasure to accompany, left the Navy Yard in the steam-tug *Pusey*, and were landed at the fort a little before sundown.

A Fresnel lens, of the 4th order, had been loaned for this occasion by Secretary Jenkins. It was placed on the parapet of the fort, the apparatus adjusted to it, the battery filled, the mercury poured in the reservoirs; and, in the course of a couple of hours, everything was in readiness for a display of the light.

By previous agreement at Washington, certain signals, represented by numbers, were to be made to the President, who witnessed the light from the "White House." A rapid succession of flashes indicated when a signal was about to be made; then, if 23, for instance, was the number of such signal, there would be given, first, two distinct flashes—then a pause, say of half a minute—and, again, three distinct flashes.

A large number thus made were sent during the evening, all of which were clearly seen and interpreted. The experiment continued about three hours, when our party returned to Washington.

Owing to the limited time for preparation, the arrangements in this instance were necessarily imperfect, and did not do justice to the skill of Professor Way. It was not certain that the lens was quite level, or that the light was quite in the focus; and thus, owing to the small bulk of flame, and consequent small divergence of the rays, it is probable that much light was either thrown above or below the horizon.

But, inasmuch as all essential features were embodied in the apparatus employed, it is hoped that a slight sketch may not be devoid of interest at a time when so much attention is being directed to superior modes of illumination.

The battery consisted of about 45 Bunsen elements (solid carbon, as obtained from gas retorts, and amalgamated cast zinc, nitric acid being the exciting agent). The cost of maintenance per hour is stated by Professor Way to be about 38 cents.; but this, he believes, may be reduced one-half, by recovering the nitric acid and utilizing the product.

A noticeable objection to this form of battery is the abundance of nitrous fumes generated, which are very stifling, and would render indoor operations hazardous, if not impossible.

Professor Way states that the magneto-electric machine, generating current electricity, will answer equally well for the mercury light.

It would no doubt, in the majority of cases, be substituted for a battery, although it would render necessary a steam-engine, or other power. Here is a case where a small economical motor, like Ericsson's hot-air engine, might be advantageously introduced—one requiring no specially skilled labour, dispensing with such dangerous adjuncts as steam-boilers, and independent of a water supply—not always to be had when most wanted.

Fig. 1 is an elevation, partly in section, of the lens and apparatus as used at the fort. Fig. 2 is an enlarged section of the parts immediately around the light. Fig. 3 is a plan of the lower part of Fig. 2, and shows how the flanch of the cylinder C is secured to the plate K. Fig. 1 is drawn about one-tenth of real size. Figs. 2 and 3 are quarter size.

The mercury is first poured into the upper cast-iron reservoir A (Fig. 1), whence it issues through the wrought-iron tube E, and is conducted immediately over the glass cylinder C, where the light is exhibited. The pipe E is connected with the parts below it by means of a short piece of gutta-percha tube; this arrangement permits the removal of the glass cylinder and attachments, the adjustment of the moveable tube D, and also affords a convenient mode of stopping the flow of the mercury when desired.

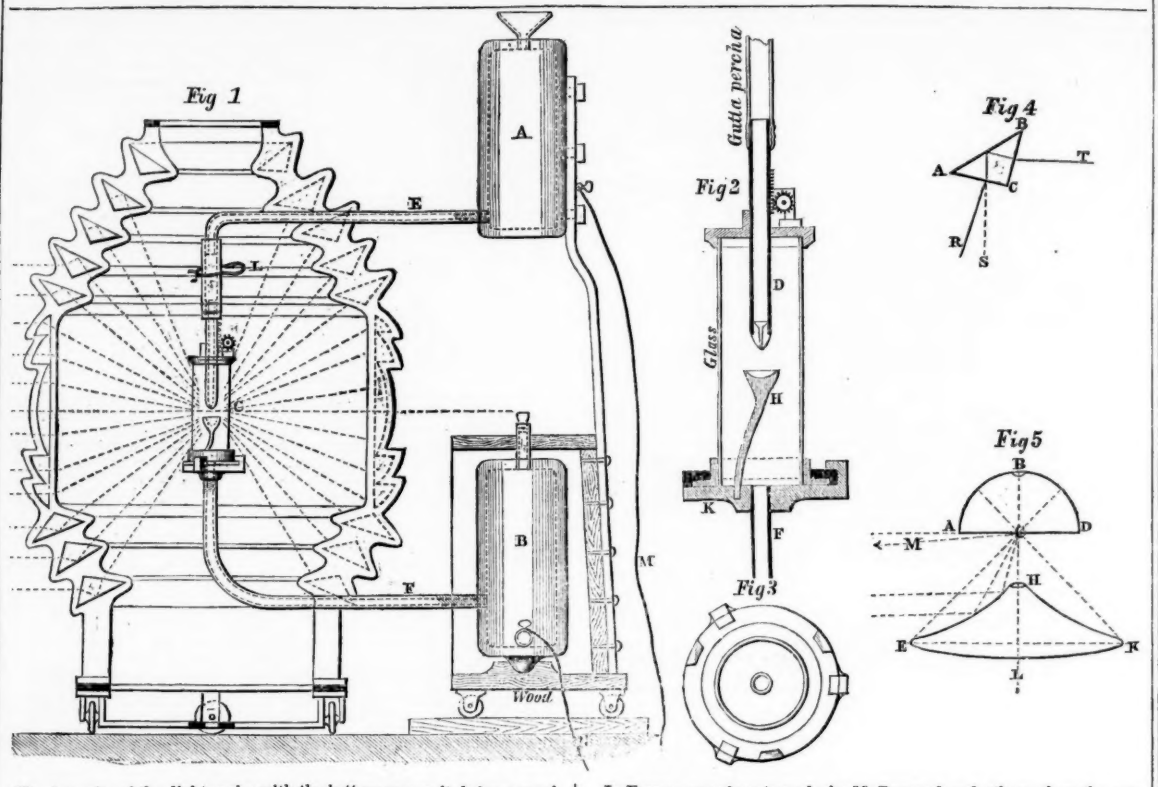
The latter is effected by a steel clasp L, which compresses the tube tightly, but is removed when the light is in operation.

The sliding tube D, which enters the cylinder C, is made of steel, smoothly finished. It has a rack on one side, into which a small pinion gears, whereby the tube may be raised or lowered. At the lower end, there is an orifice not larger than a fine sewing-needle; through this the mercury flows, in a stream resembling a thread of silver, into the small cup H beneath; the said cup being of wrought iron, with its stem screwed into the cast-iron plate K. The light is produced between the tube D and cup H, by the electricity traversing the slender thread of mercury, which it does when the wires M and N are connected with the battery to complete the circuit.

The cylinder enclosing the light is one piece of glass, both ends being cemented in brass flanches with red lead. The lower flanch and the plate K are carefully faced, so as to form an air-tight joint. All parts of the cylinder and attachments are made so as to completely prevent the escape of mercurial vapour into the outer air.

The mercury overflowing the cup H, passes into the lower cast-iron reservoir B, by means of a wrought-iron tube F, whence it may, from time to time, be drawn off, and returned to the upper reservoir A. The insulation of the reservoirs and attachments is effected simply by the wooden box shown in Fig. 1.

It is important to notice that, in the production of the light, the mercury is *not consumed*, but it may be used over and over again, without any apparent deterioration or loss.



The *intensity* of the light varies with the battery power, it being a maximum some time after the battery is filled, and becoming weakened towards the close, as the acids become saturated.

The electricity dashes the mercury against the side of the cylinder C, and, after a time, patches, resembling the coating of ordinary mirrors, adhere to the glass. These, being opaque, injure, to some extent, the efficiency of the light; but, as new cylinders can be readily exchanged for such as become coated, it is not believed that this is a serious difficulty. During the three hours the light was exhibited at Fort Washington, no deposit was found on the glass.

The capability that Professor Way's light possesses, of being instantaneously lighted and extinguished, and in any order we please, renders it not only very valuable for military purposes in signalling, but also promises to solve an important problem in lighthouse engineering—viz., so to distinguish a given lighthouse from every other on a coast, so as to enable the mariner approaching and seeing the light to determine his position, and thereby reduce the difficulty and avoid the dangers incurred in making a harbour.

By means of clockwork, arranged by Professor Way, the circuits are broken in any given order, producing corresponding occultations of the light; and a lighthouse may thus have a particular number given to it, indicative of its character and position. This number may be repeated at short intervals throughout the night.

The mode of distinguishing lights by occultation was proposed some years ago by Babbage, but not executed, owing, perhaps, to the difficulty of applying such a system to the present arrangement of optical apparatus. The flashing lights produced by the Fresnel lenses are the nearest approach to such a system that has yet obtained any considerable currency.

There is a great saving in bulk and cost of lens apparatus with the electric light. This will be the more apparent, when we remember that our first order lenses, such as those at Capes May, Henlopen, Hatteras, &c,, are about 6 feet diameter and 9 feet high, and are obtained from M. Lepaute, or Messrs. Sautter and Co., of Paris, at a price varying from 5000 to 11,000 dols.

In place of these, apparatus not exceeding in cost 400 or 500 dols. might be readily substituted; indeed, Professor Faraday states that all the light from an electric lamp might be utilized in a space not exceeding the size of an ordinary hat, reducing the cost yet more. It is well known that, with our present system, with oil-lamps, we have but one method of increasing the *quantity* of light—that is, by increasing the number of burners, and thereby necessarily increasing the bulk of the flame. In a first order lamp, for instance, there are four concentric wicks, the outer one being about $3\frac{3}{4}$ inches diameter; this bulk of flame renders it exceedingly difficult to utilize the light, for, if the prisms are true for one point or focus, they will not be so for other points in the luminous mass, and it becomes necessary that the lens be large, in order that the flame may be relatively small.

But, with the electric lamp, any amount of light may be accumulated *in the focus*, by increasing the amount of electricity, which, of course, involves a corresponding increase in cost.

Professor Holmes' magneto-electric light, with carbon points, has been on trial for six months in the South Foreland Lighthouse, England; and, from the evidence given in a late parliamentary report (1861), it would seem to have been eminently successful.

In France, also, a somewhat similar arrangement has been successfully employed, the magneto-electric machine being slightly different, the currents in the English machine being in one direction, while those in the French machine alternate. No practical difference between the two lights has been detected.

Professor Faraday compared the intensity of the electric light with that of the sun, by means of dark glass; they were about equal, but the sun was not at its brightest. In relation to the South Foreland light, he says: "The eyes of the keepers are not affected, though the blue glasses provided for them are very pale in colour, for the light is better watched by observing the *place* and *intensity* of the rays which fall here and there on the walls of the lantern, than by looking at the light itself."

In France, experiments made by M. Reynaud and others, show the comparative intensities of various lights, as follows:—Argand burner, 1; First order flash, 80 to 90; Electric light, 94; do. cast-glass flash, 55,000; do. first order flash, 220,000.

The intensities of the lights were tested by looking at the shadows projected by them on a screen of whitened glass, placed at a distance of 20 yards from the electric light; the figures given above are the results of calculation, and cannot be taken as exact, though they express the differences roughly.

The ability of the electric light to penetrate a thick, hazy atmosphere, will doubtless be one of the strongest inducements for its introduction. The sailors on board steamers plying between France and England say they can see Professor Holmes' light, in such weather, seven miles further than any other.

Utilization of the Light.

The superiority of the dioptric lens over reflectors has been generally insisted upon; but Professor Potter, of London, who has made extensive photometric experiments, doubts the great advantages which have been claimed for the Fresnel lens. He has found that about one-fourth of the light is lost by reflection and absorption in passing through a thickness of *two inches* of clear flint glass with highly polished surfaces, and that good ordinary looking-glass reflects *six-tenths* to *two-thirds* of the light falling upon it, and that highly polished mirrors, of speculum metal, as used in reflecting telescopes, reflect still more.

Professor Faraday states the absorption of light by dioptric apparatus to be 50 per cent., and that pure silver, highly polished, reflects 95 per cent. of the total quantity falling upon it.

Sir David Brewster considers a spherical mirror, composed of flint glass prisms, as used in the many forms of holophotal apparatus, as greatly inferior to one made by Foucault's apparatus.

Sir J. F. W. Herschel has recently proposed an improved reflector, which is likely to prove a great economizer of light.

With the ordinary parabolic form, part of the light is thrown upward against the sky, unnecessarily illuminating the stars; and although, in the Fresnel lens, this defect is remedied to some extent, there is still considerable loss, more especially in the catadioptric zones. This will be readily seen by referring to Fig. 4, where R, the ray proceeding from the focus, is refracted to the back of the prism A B C, and then reflected and refracted out towards T, whereby much light is absorbed in pursuing such a circuitous route; and, when the zones or prisms are highly polished, as they usually are, there is also the additional loss by reflection towards S.

The loss from imperfect brilliancy of the ordinary plated reflectors is greatly reduced by the recent discovery of Liebig, wherein pure silver is precipitated from its solution, contained in a thin shell of glass. The silver, by this method, is protected against all the agencies which tarnish it, and it is affirmed that 91 per cent. of the light is reflected by it.

Sir J. F. W. Herschel proposes to make use of these mirrors, at the same time so arranging their shape that the losses and disadvantages due to the common form may be avoided. This is accomplished as shown in Fig. 5, C being the focal point, or source of light; A D B being a hollow hemispherical reflector; E H K a conoidal reflector, whose surface is generated by the revolution about the vertical axis, C L, of an ellipse whose major axis, C M, dips below the geometric horizon. By the above arrangement, it has been demonstrated that the most advantageous dispersion of light over the sea surface is obtained; while the entire horizon may be illuminated, if necessary, by a single flame, as in the dioptric arrangement. All the light diverging upward is turned back, and, passing again through C, radiates thence downward, and in effect nearly doubles the intensity.

Although adapted to ordinary oil-flames, the most appropriate light is considered to be that obtained by electricity.

The Earl of Rosse, in commenting upon the present defective mode of constructing reflectors of thin sheet metal, says reflectors should be cast of gun-metal (9 of copper and 1 of tin), turned in a lathe to obtain a true surface, electro-plated carefully, and finally polished in a lathe.

WIDE ESTIMATING.—With reference to a paragraph, under this head, inserted in our last, Mr. Bower, of St. Neots, desires it to be stated that his tender for the erection of the gas-works at Kibworth was not based upon the plans prepared by Mr. Gill; and Messrs. Bromley and Woodcock, of Leicester, inform us that their tender was ultimately accepted, it having been discovered that in the tender of Messrs. Law and Sons some portion of the mains had been omitted.

DR. J. NORTHCOTE VINEN'S REPORT ON THE GAS SUPPLIED BY THE SURREY CONSUMERS COMPANY:—

1862. Week ending.	Number of Observations.	Maximum Light. Candles.	Minimum Light. Candles.	Average Light. Candles.
June 21	4	15·23	14·28	14·72
„ 28	4	14·83	13·53	14·21

The volume of hydrocarbons averaged 4·25 per cent.; carbonic acid, 0·62 per cent. No sulphuretted hydrogen could be detected. The gas appeared to be free from ammonia, except on the 17th, when there was a slight trace.

DR. HILLIER'S REPORT ON THE GAS SUPPLIED IN ST. PANCRAS.—The gas supplied during the month of May yielded the following results:—It was examined on three days in each week, and each examination included ten observations. All the experiments were made in accordance with the requirements of the Act, the gas being burned from an argand burner of 15 holes, with a 7-inch chimney, at the rate of 5 cubic feet per hour, and compared with the light of a sperm candle burning at the rate of 2 grains per minute. The maximum result obtained was 13·39 candles; the minimum was 12·00 candles; the average was 12·8 candles. In his report for April, Dr. Hillier mentioned that, by using a burner with holes which were very small, a much lower illuminating power was obtained than by using a burner with larger holes. He did not, it appears, make himself quite clear that both these burners were in accordance with the requirements of the Metropolis Gas Act, 1860, and reminds the vestry that he called attention to the circumstance at more length in reports which he made in October and November last, in order to show the latitude which is still left by the Act, and the importance of some arrangement being come to, so as to insure more uniformity of results. It would be well that the gauge of the apertures of the burners, and the pressure at which gas is burned, should be accurately defined. During the month of May, he used a burner with rather small holes, and the gas has been burned at a pressure of 7-10ths of an inch. The results, therefore, are satisfactory; because, even with the small-holed burner, the gas has not been found below the parliamentary standard. He found no indications to test-paper of sulphuretted hydrogen or ammonia, nor did he find the pressure, at any time, below 6-10ths of an inch.

GAS-EXAMINERS UNDER THE METROPOLIS GAS ACT.—At the meeting of the Rotherhithe vestry, held on Tuesday, the 3rd ulto., the question of continuing the office of chemical examiner of gas came on for consideration, and Mr. Barrett expressed an opinion that the sooner the office was abolished, the better. Mr. Hay said the gas was very much improved, and he moved that the office be continued for another year, thinking that the salary was money well laid out. Mr. Arnold seconded the motion. Mr. Newnham moved, as an amendment, that the office be discontinued at Michaelmas next. The amendment was seconded and carried, there being 13 votes for and 2 against it. At the Wandsworth district board, on the 4th ulto., a letter was read from Mr. F. W. Beaumont, thanking the board for appointing him to the office of gas-examiner. He stated that he had inspected the premises provided by the several companies for testing the gas, and the quality supplied by all was about equal to 14½ candles; and it was also remarked that the two places appointed by the Phœnix Company were at their works, instead of, as near as may be, 1100 yards distant, as required by the Act. Mr. Beaumont also asked the board to supply him with some instruments to carry out the duties of the office. The board instructed the clerk to write to the Phœnix Gas Company, calling attention to the clause in the Metropolis Gas Act, which provided that the testing-house was to be about 1000 yards from the works, and inquiring why theirs was not at that distance? The meeting also directed Mr. Beaumont to report in detail, at the next meeting, what instruments he would require to carry out the duties of the office.

Price Current.

CASTINGS.—*Per Ton.*

Average Weight of Cast-iron Gas-pipes, per Yard.

1¼ in.	2 in.	2½ in.	3 in	4 in.	5 in.	6 in.	7 in.	8 in.	9 in.	10 in.	12 in.
16	21	28	33	51	70	89	107	126	149	177	208 lb.

Retail Prices are 5 to 10 per cent. higher.	London.	Glasgow.	Newcastle	Wales.	Yorkshire, Derbyshire, and Staffordshire.
	£. s. d.	£. s. d.	£. s. d.	£. s. d.	£. s. d.
Pig Iron, No. 1, G.M.B.	3 5 0	2 13 6	2 15 0	3 0 0	3 5 0
1¼ and 2-inch Socket-pipes	7 0 0	6 0 0	6 5 0	6 10 0	6 15 0
2½ and 3-inch ditto	6 10 0	5 10 0	5 15 0	6 0 0	6 5 0
5 and 5-inch ditto	6 0 0	5 0 0	5 5 0	5 10 0	5 15 0
6 inches and upwards ditto	5 15 0	4 15 0	5 0 0	5 0 0	5 10 0
Retorts, 1st fusion, hot blast	5 10 0	4 10 0	4 15 0	5 0 0	5 5 0
Ditto, 2nd ditto, cold ditto	6 10 0	5 5 0	5 10 0	6 0 0	6 5 0
Tank-plates, ¼ thick and above	6 0 0	5 0 0	5 5 0	5 10 0	5 10 0

WROUGHT-IRON TUBING,

Subject to 40 per cent. Discount.

	2 in.	1½ in.	1¼ in.	1 in.	¾ in.	½ in.
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.
Patent Welded Tubes, from 2 to 12 feet—per foot	1 8	1 0	0 10	0 7	0 5	0 4½
Ditto ditto, from 6 inches to 18 inches—each	3 0	2 0	1 9	1 3	1 0	0 9
Connecting-pieces, or Long Screws	3 6	2 3	2 0	1 6	1 2	0 11
Bends, Springs, and Elbows (wrought iron)	3 9	2 3	1 9	1 0	0 10	0 8
Tees, wrought or cast	4 0	2 6	2 0	1 6	1 1	0 10
Crosses, ditto	4 6	3 0	2 6	2 0	1 6	1 2
Iron Cocks	17 6	9 6	7 6	4 6	3 3	2 6
Ditto, with brass plug	28 0	16 0	13 0	7 0	5 6	4 6
Diminishing Sockets, Caps, Plugs, and Nipples	1 3	0 9	0 8	0 6	0 5	0 4
Plain Sockets	1 0	0 8	0 7	0 5	0 4	0 3
Syphons, 2-quart	15 0	14 0	13 6	13 0	12 0	—

COALS.—*Per Ton.*

Newcastle.—Unscreened.		*Scotch Cannel.*	
Whitwell Primrose	6s. 9d.	Boghead (at Leith)	45s. 0d.
Medomsley, Eighton Moor, and Burnhope	7 0	Kirkness, best	23 0
Pelaw	7 3	Capeldrae, 1st quality	20 0
New Pelton, Pearcth, South Pelaw, Washington Hutton, and South Pearcth	7 6	Ditto, 2nd ditto	12 6
Pelton	7 9	Lesmahago (at Glasgow)	25 0
Ramsay's Newcastle Cannel	16 0	Ditto (at Leith)	27 6
		Arniston	27 6
		Wemyss	20 0
		Knightswood	18 0
		Pirnie	14 0

FREIGHTS.

Coastwise—Newcastle.—Per Ton.		*Foreign.—Per Keel.*	
Chatham and Rochester	5s. 6d.	Barcelona	£24. 10s. to £25 0s.
Cork	8 3	Bordeaux	16 0
Dover and Folkestone	5s. 9d. to 6 0	Boulogne and Calais	4 5
Dublin	8 9	Cadiz	16 0
Exeter Quay	—	Cronstadt	£11. 15s. to 12 0
Ipswich	6s. 3d. to 5 6	Copenhagen	9 10
London (Pool)	5s. 9d. to 6 0	Genoa	£24. 0s. to 24 10
Lowestoft and Yarmouth	4s. 6d. to 4 9	Hamburg	£8. 5s. to 8 10
Lynn	—	Havre de Grace	£9. 0s. to 9 5
Portsmouth and Southamptn.	7s. 0d. to 7 3	Leghorn	£23. 10s. to 24 0
Plymouth	7 3	Lisbon	15 0
Shoreham	—	Rotterdam	£7. 5s. to 7 10
Whitstable	—	Stettin	11 0
Weymouth	7 0	Trieste and Venice	£23. to 25 0

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Cliff's Fire-bricks (at Wortley)—per 1000		2	15 6
Ingham's ditto (at Wortley)—per 1000		2	15 0
Fire-clay Retorts—per foot run	5s. 6d. to	0	7 0
Tough Cake Copper—per ton		90	10 0
English Pig Lead—per ton		20	10 0
Welsh Bar Iron (in London)—per ton		6	0 0
Foreign Spelter—per ton		17	15 0
English Block Tin—per ton		114	0 0
Banca—per ton		123	0 0
Tarred Rope Yarn—per cwt.		1	6 0

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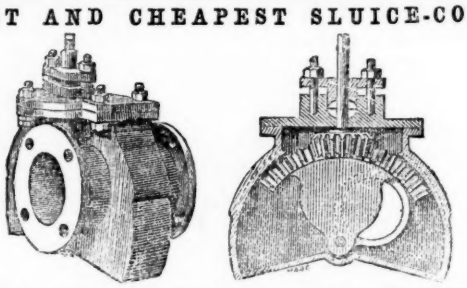

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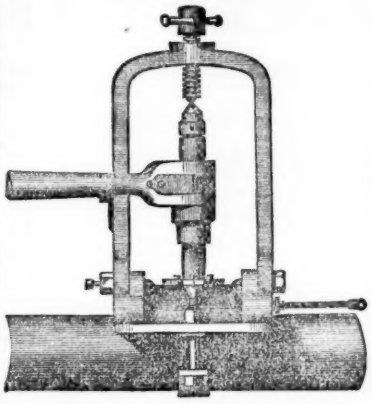

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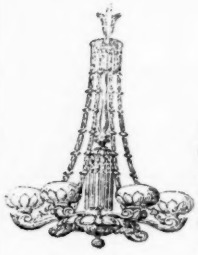
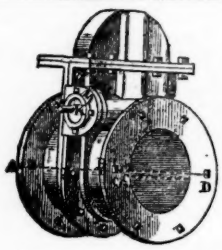
Agent for London, Mr. JOHN REED, 44, Argyle Square, King's Cross, LONDON,



F. & C. OSLER,
45, OXFORD STREET, LONDON;
Manufactory—Broad Street, Birmingham—Established 1807,
MANUFACTURERS OF GLASS CHANDELIERS, GLASS LUSTRES, TABLE GLASS, &c. &c.

ELEGANT CRYSTAL GLASS CHANDELIERS, for GAS, from £4 upwards (Made from "REGISTERED" DESIGNS), with GLASS BRANCHES, &c.; suitable for DRAWING-ROOMS and BALL-ROOMS. The more extensive use of Gas in private dwellings has induced Messrs. OSLER to direct their particular attention to the manufacture of this class of articles—which, with a view to their general adoption, are offered at very moderate prices. Purchasers can select from a great variety of patterns, to which additions are being constantly made.

THEATRES, CONCERT, ASSEMBLY, AND BALL ROOMS LIGHTED BY ESTIMATE ON THE LOWEST TERMS.



REDUCED PRICES OF
BRYAN DONKIN & CO.
IMPROVED GAS VALVES
from 2 inches to 18 inches, price 9s. 6d. to 12s. per inch diameter

List of prices, with full dimensions of all sizes up to 30 inches, to be had on application.

These Valves are all proved to 30 lbs. on the square inch before leaving the works, and are always kept in stock.

Valves made with Outside Racks to order. Also, Screw Water-Valves with Gun-Metal Faces.

BRYAN DONKIN & CO.,
ENGINEERS,
NEAR GRANGE ROAD, BERMONDSEY.

FIVE HUNDRED
HOLMAN'S PATENT DOUBLE-ACTION PUMPS
Prove their general adaptation. They are adopted by
CIVIL, MARINE, MANUFACTURING, AND MECHANICAL ENGINEERS.

For Pumping TAR, AMMONIACAL LIQUOR, WATER, WORT, and other fluids, their intrinsic excellence is too well known to need description.

S. HOLMAN tenders his hearty thanks to all Patrons, and is prepared to undertake the Supply of Towns, Public and Private Establishments, and Irrigation of Lands, on any scale.

Sole London Agent of the Williams's Perran Foundry Company, for the Sale of Cornish Pumping, Winding, and other Steam-Engines, heavy Machinery, Castings, and Forgings.

London Agent for Tangye's Patent Hydraulic Presses, Jacks, Lifts, Crabs, Cranes, Blocks, &c.

ALL KINDS OF HYDRAULIC AND STEAM MACHINERY FOR HOME USE OR EXPORT.

Illustrated Catalogues free.

LONDON AGENT FOR WROUGHT-IRON TUBES AND FITTINGS,
S. HOLMAN, C.H.E., 18, CANNON STREET, E.C.

WALKERS GAS-VALVES
HAVE BEEN
DURING THE PAST TWENTY-FIVE YEARS,
USED IN UPWARDS OF
450 BRITISH and FOREIGN GAS-WORKS.

They are made in the most SOLID, SUBSTANTIAL manner, with PLANED and SURFACED JOINTS, and SCRAPED SURFACES. They have a CLEAR, FULL BORE, in a STRAIGHT LINE of PIPE, and are TIGHT to PERFECTION.

Engineers are requested to insert "Valves of Walkers Manufacture" in their Specifications, by which they will be absolutely certain of the above important advantages. They can name the construction of Valve they prefer best, as Walkers make them of every description—either Walkers SCREW-VALVES, for the Gas-Works or for Street-Mains; INTERNAL RACK-VALVES; or the ORDINARY RACK and PINION-VALVES. REGULATING-VALVES, with INDICATING COLUMNS, &c.

Walkers London Manufactory is devoted entirely to the above class of work, of which their make is nearly double that of any other British house.

INTERNATIONAL EXHIBITION.—Class 10.

A Gas-Valve of each kind can be seen in the above Class. HER MAJESTY'S COMMISSIONERS selected Walkers Valves for the LIGHTING OF THE BUILDING, and the PRESSURE and SUPPLY is governed by Walkers Regulating Indicating Column and Valve, which can be SEEN IN ACTION in the the Gas-Meter Room, Austrian Court.

WALKERS DOUBLE-FACED WATER-VALVES
Possess a most important practical improvement on the Stuffing-Box, effecting a large saving in a Water-Works Company's expenses. They are made with Four Gun-Metal Faces, scraped Surfaces, Gun-Metal Screws and Nuts, and are proved to three hundred pounds on the square inch.

IMPROVED DOUBLE-FACED HYDRANTS, &c.
Drawings and Prices on Application.
LITTLE SUTTON STREET, LONDON, E.C.

INTERNATIONAL EXHIBITION—CLASS XXXI. AND XXXIV.

THE NEW CRYSTAL STAR AND SUN LIGHT.

J. DEFRIES & SONS,

MANUFACTURERS OF

CRYSTAL, BRASS, AND ORMOLU CHANDELIERS;

BRACKETS, PENDANTS, AND VESTIBULE LIGHTS;

MEDIÆVAL, AND OTHER GAS-FITTINGS.

Works—

LONDON AND BIRMINGHAM.

PRINCIPAL DEPOT AND LONDON SHOW-ROOMS—

147, HOUNDSDITCH, CITY.

Estimates and Designs for Lighting and Ventilating Theatres, Concert-Rooms, Public and Private Buildings, can be had upon application at the above Address.

Registered Designs of Crystal Chandeliers, for Gas or Candle, always on Show.

The PATENT GAS-REGULATOR AND PURIFIER, reduced to 6s. 6d. per dozen.

A Large Assortment of Gas Moons, Chimneys, and Reflectors, of every description, always on hand.

WALTER FORD,

LATE

PADDON and FORD,

GAS-METER AND APPARATUS WORKS,

GRAY'S INN ROAD, LONDON.

MANUFACTURER OF WET AND DRY GAS-METERS, STATION-METERS, GOVERNORS, &c. &c.

A large number of **STATION-METERS,** up to 80,000 feet per hour (being by far the largest in use), and **GOVERNORS** for **MAINS,** up to 24 inches, have been constructed by Paddon and Ford. These Meters and Governors possess peculiar advantages as regards strength and freedom of action.

Sole Manufacturer of **PADDON'S PATENT STREET-LAMP REGULATORS,** for insuring any required consumption. These Regulators are in general and increasing use, and references can be given to Gas Companies who use them for every Lamp.

THE ALPHA TUBE WORKS,

WALSALL, STAFFORDSHIRE. ESTABLISHED 1830.

LAMBERT, BROTHERS,

MANUFACTURERS OF

WROUGHT-IRON TUBES AND FITTINGS,

For Gas and High-pressure Water and Steam.

W. J. HOLLANDS,

IRON MERCHANT AND AGENT,

AND

Wholesale and Retail Charcoal and Coke Dealer, and Grinder,

12 & 31, BANKSIDE, & GREAT SUFFOLK STREET, SOUTHWARK, S.E.

ALL GOODS KEPT IN STOCK, AND SUPPLIED AT MANUFACTURERS PRICES.

Cast-Iron Socket, Flanch, Hot Water-Pipes and Connexions, for Gas, Water, and Steam purposes, Rain-Water-Pipes and Guttering, &c. Furnace-Pans and Stable-Fittings. Retorts, Hydraulic Main, Furnace-Work, &c. Lamp-Columns, Lanterns, Cocks and Burners, Wrought-Iron Tubing, &c., of best description. Screw-Cocks, Sluices, and Gas-Valves of every description. Bar, Rod, Plate, and Hoop-Iron Bolts and Nuts. Cast-Iron Columns, Girders, Street-Posts, Watering-Posts, Gutters, Gratings and Railing-Bars, Tank-Plates, and Pump-Castings. Engine, Mill, and Lathe Castings. Planing, Turning, and Boring executed. Cast-Iron Pans, for Soap and Chemical Works. Galvanized Cast-Iron Jars and Pots, for Sugar Refiners. Stourbridge and Newcastle Fire-Bricks, Retorts, Lumps, Tiles, and Clay. Malleable Iron Castings. Pipe-Laying by Contract. Double-Refined Machinery Oil. Iron Borings. Salammoniac and Sulphur.

Castings made in Town or Country, on the shortest notice, to Sketches, Drawings, or Patterns.

Best Animal Charcoal, for Sugar Refiners, and Case-Hardening.

Best prepared Wood Charcoal. Prepared Fuel for Smokeless Stoves guaranteed. Granulated Charcoal for Air and Water Filters. Chemists and Druggists supplied with Pulverized Carbon. Charcoal and Coke Blacking, and Coal-Dust, and superior strong Coke, for Foundry purposes. Gypsum of the finest and purest quality. Sulphate of Ammonia.

Estimates given, and Orders by Post punctually attended to the same day.

AGENT FOR

BECK'S PATENT STOP-VALVES,

For Gas, Water, Steam, and General Purposes, and

DAVIS'S PATENT COMBINED SMALL-COKE OR BREEZE OVEN, & SMOKE CONSUMER.

JOSEPH BOULTON,

28, BAGNIGGE WELLS ROAD, CLERKENWELL,

PATENTEE OF

DRY & IMPROVED WET GAS-METERS,

AND

GAS APPARATUS.

All Meters warranted to comply with the Act of Parliament.

WOLVERHAMPTON RETORT WORKS.

ESTABLISHED **1840.**

JOHN EUNSON AND SON,

GAS ENGINEERS, AND MANUFACTURERS OF CLAY RETORTS,

AND FIRE GOODS IN GENERAL,

WOLVERHAMPTON.

Retort Mouthpieces, Bolts, Nuts, and every description of Wrought-Iron Work.

HARPER AND MOORE,

LOWER DELPH FIRE-CLAY AND BRICK WORKS,

STOURBRIDGE,

PROPRIETORS OF

BEST CLASS HOUSE-POT, & CRUCIBLE CLAY.

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS,

OF ALL DIMENSIONS.

LUMPS, TILES, BRICKS, &c.

Estimates given on application. Shipping Orders executed with despatch.

GEORGE BOWER,

GAS ENGINEER, MANUFACTURER, AND CONTRACTOR,

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References to between 100 and 200 Gas-Works Designed and Erected by the Advertiser.

SAMUEL CUTLER, Gasholder

MAKER and CONTRACTOR

For Tanks, Roofs, Purifiers, Condensers, Erection and Alteration of Works and every description of GAS APPARATUS,

PROVIDENCE IRON WORKS,

MILL WALL, POPLAR, LONDON, E.

Main Laying and Gas-Works erected complete.

JAMES OAKES and CO.,

ALFRETON IRON WORKS, DERBYSHIRE,

AND

WENLOCK IRON WHARF, 20, WHARF ROAD, CITY ROAD, LONDON,

Beg to inform Gas and Water Companies and the public, that they keep in stock in London all the CASTINGS in general use in Gas and Water Works, including Iron Retorts, Socket and Flange Pipes, Bends, Branches, and Syphons of all sizes, Lamp Columns, &c., &c.

N.B.—Orders for Cast-iron Tanks, Girders, Columns, Cylinders, and all irregular castings, will have immediate attention.

CHARLES HORSLEY, Agent.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas Works and Water Works.

Warehouse in London for Cast-iron Pipes and Connections of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Office in London, MR. E. M. PERKINS, 78, Lombard Street.

WILLIAM BLEWS AND SONS,

IMPROVED MACHINE-MADE BURNERS

WROUGHT-IRON BATSWINGS,

FOR RAILWAY STATIONS AND MARKETS,

GAS-FITTINGS, CHANDELIERS,

BRASS AND IRON TUBES OF EVERY KIND

SUPPLIED ON THE BEST TERMS,

AT THE WORKS,

9, 10, 11, BARTHOLOMEW STREET,

BIRMINGHAM.

ROBERT MACLAREN and CO.,

EGLINTON FOUNDRY, GLASGOW,

Manufacturers of all sizes of Cast-Iron Main Pipes, by an improved Patent. General Ironfounders, Gas Engineers, and Wrought-Iron Tube Makers.

LESLIE'S PATENTS: Gas and

Coke from common Coal, greatly increased in value.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Up to

Forty Candle Gas.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: Licenses

for England, Scotland, and Ireland, the 86 Departments of France and Belgium.—60, Conduit Street, LONDON, W.

LESLIE'S PATENTS: The

National Waste Heaps at Collieries UTILIZED for Gas purposes.—60, Conduit Street, LONDON, W.

ALFRED PENNY, Gas and

CONSULTING ENGINEER,

WENLOCK IRON WORKS,

21 & 22, WHARF ROAD, CITY ROAD, LONDON.

Mr. PENNY having had a large experience in the construction, alteration, and management of Gas-Works, begs to inform the Directors of Gas Companies that he may be consulted on all matters appertaining thereto. He also manufactures Gasholders, Purifiers, and all the various apparatus used in Gas-Works, and keeps in stock Retorts and Mouthpieces, Socket-Pipes, Bends, Branches, T-pieces, &c. &c.

Plans, Specifications, and Estimates prepared.

GUEST & CHRIMES,

FOUNDRY AND BRASS-WORKS, ROTHERHAM,

AND

37, SOUTHAMPTON STREET, STRAND, LONDON,

(Late CROSLEY & CO.,)

GAS-METER MANUFACTURERS,

REMOVED, from 103, SOUTHWARK BRIDGE ROAD, LONDON, to

ROTHERHAM.

Gas-Meter Works, 103, Southwark Bridge Road,
London, April, 1862.

SIR,

I have the pleasure to inform you that I have ceased to be a gas-meter manufacturer, having disposed of my business to the well-known firm of Guest and Chrimes, of Rotherham, the makers of the Patent High-Pressure Water-Meter, and High-Pressure and Patent Fire-Cock, who will henceforth be the Sole Manufacturers of Crosley and Goldsmith's Patent Compensating Wet Gas-Meter.

The well-established reputation of that firm, as to quality of materials and workmanship of all goods supplied by them, is a sufficient guarantee that the character of these Meters will be maintained at the high standard of excellence which has always attached to them; and I have full confidence in asking for them a continuance of the patronage I have hitherto enjoyed from you.

My late manager, Mr. Lane, remains with Messrs. Guest and Chrimes, in the position he has held in these works since their establishment. Begging you to accept my best thanks for the favours I have received at your hands during my connexion with the business,

I am, Sir, yours most obediently, ISAAC BRIGGS.

Foundry and General Brass-Works, Rotherham, and 37, Southampton Street, Strand, London, W.C.
Rotherham, April 11, 1862.

We have the pleasure of informing you, as intimated in the annexed letter, that we have purchased the business of Mr. Isaac Briggs, of 103, Southwark Bridge Road, London, Manufacturer of Crosley and Goldsmith's Patent Compensating Gas-Meter, which it is our intention to remove to our works at Rotherham. The established character of the Meter for accuracy of registration needs no comment from us. It is especially constructed to meet all the requirements of the recently-imposed Sale of Gas Act, and upon such certain and simple principles as to insure correctness of measurement for long periods, without involving the necessity of constant care and attention on the part of the companies' inspectors and officers, as the large quantity of water contained in the surplus reservoir (except in extreme cases) will insure many months working. We have, therefore, the greatest confidence in soliciting your orders, feeling quite certain of their giving full satisfaction; and we would remark that, though apparently a high price, yet, when the quality of the workmanship and materials is taken into consideration, in addition to the large capacity of the Meter, and its other advantages, it will bear a comparison with any first-class article.

We would add that, although not enumerated, all the various articles made by the late firm will be manufactured by us, and under the same management as previously. We hope shortly to be in a position to submit to you a detailed description of the Meter, and all other articles we manufacture connected with Gas, its distribution and consumption, with prices of the same. Soliciting your commands,

We are, yours respectfully, GUEST & CHRIMES.

SOLE MANUFACTURERS OF

CROSLEY & GOLDSMITH'S

PATENT SELF-ADJUSTING & COMPENSATING GAS-METERS,

Which, by a simple arrangement of machinery, maintain a constant, true Water-Line.

N.B.—The Patent can be applied to any existing Wet Gas-Meters.

Manufacturers of EXPERIMENT METERS, GOVERNORS, MINUTE-CLOCKS, PHOTOMETERS, &c., &c., similar to those used by Mr. King, of Liverpool; and other Patterns.

Consumers' Governors; Inspectors' Pocket, and all other kinds of Pressure-Gauges; Thermometers;

STANDARD TESTING GASHOLDERS,

And Apparatus required under the Sales of Gas Act.

STATION-METERS & GOVERNORS; PRESSURE-REGISTERS & EXHAUSTER-REGULATORS.

Also, Manufacturers of LOWE'S PATENT MOTIVE-POWER METER, for situations where there is an inadequacy of pressure to supply the special requirements of certain consumers in low grounds during the day or night. Also,

MANUFACTURERS OF

BATEMAN AND MOORE'S, AND CHRIMES'

PATENT HYDRANTS, OR FIRECOCKS.

Improved Sluice-Cocks and Gas-Valves; Chrimes' Patent High-Pressure Single and Double Loose-Valve and Screw-Down Cocks; Pilbrows' Patent Water-Waste Preventer;

PATENT ABSOLUTE WATER-WASTE PREVENTER;

Siemens' Patent Balance Water-Meter; Bell and Chrimes' Patent Service-Box Valve; Improved Self-Acting and Pull Water-Closet;

ESKHOLME'S PATENT PNEUMATIC REGULATOR and VALVE-CLOSET.

Lowe's Patent Effluvia-Traps, Begg's Improved; Fire-Extinguishing Apparatus; Galvanized Iron Tubes and Fittings; *Gas Chandeliers, Brackets, and Fittings; Glass Chandeliers and Brackets.*

All the above articles may be seen on application to

THOMAS BEGGS, 37, Southampton Street, Strand, London; or to

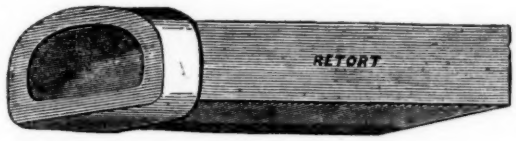
GUEST and CHRIMES, Brass-Works, Rotherham,

Manufacturers of Plumbers' and Gas-Fitters' Brass-Work of every description.

Drawings, Descriptions, Prices, and Testimonials, will be forwarded per Post, on application as above.

KING BROTHERS,

STOURBRIDGE FIRE-BRICK AND RETORT WORKS.



KING BROTHERS beg especially to call the attention of Gas Companies to the superiority of their Retorts, which are made from the celebrated STOURBRIDGE FIRE-CLAY. Mr. King has patented a Kiln for burning Retorts, by which Patent all Cold Air is excluded from the Kiln while burning, thus rendering them FREE FROM CRACKS AND CORRECT IN FORM. By great care in Manufacturing, combined with the advantages in burning, a VERY SMOOTH SURFACE is obtained, rendering them less liable to carbonize.

Retort Ovens, Fire-Bricks, Guards, Saddles, Rabbitted Burs, Flues, and Quarries, are all Manufactured of the same quality of Clay.
Every Retort and Brick is branded "King Brothers, Stourbridge."

FIRE-CLAY GAS RETORTS.

ESTABLISHED IN 1795.

JOSEPH CLIFF,

WORTLEY FIRE-BRICK WORKS, near LEEDS.

THESE RETORTS are unrivalled in excellence, being the BEST FINISHED INTERNALLY, and THE MOST CORRECT IN FORM, of any in the Kingdom. From the peculiar composition used in working up the face of the material, they are rendered unusually smooth, close, and FREE FROM SURFACE CRACKS, thus, in a great measure, preventing leakage and the adhesion of carbon to their interior surface.

To meet the yearly increasing demand of UPWARDS OF THIRTY SEASONS and to carry out the late improvements in the manufacture, the Premises have been re-erected and much enlarged, and Engineers may rely WITH CONFIDENCE on their orders being completed with a greater regard to despatch than by any other House.

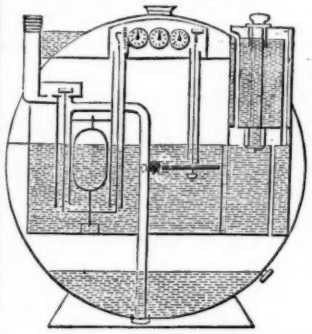
THE WORKS ARE WELL SITUATED

For EXPORT from the Ports of { LONDON, LIVERPOOL, HULL, MIDDLESBRO', HARTLEPOOL, and STOCKTON.

FIRE-BRICKS, LUMPS, GUARDS, TILES, AND CLAY OF THE SAME QUALITY.

M. P. NEWTON, London Agent, No. 4, Wharf, King's Cross Goods Station.

PATENT WET METER.



N. DEFRIES,

CONSULTING GAS ENGINEER,

Inventor and Patentee

OF

WET GAS-METERS,

WITH SELF-ADJUSTING WATER-LINE;

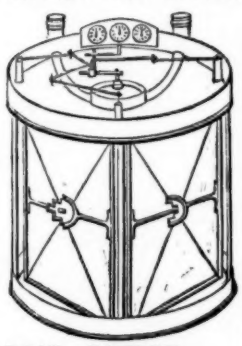
DRY METERS,

GAS-HEATING BATHS, OVENS, STOVES,

GAS FIRES with INDESTRUCTIBLE FUEL,

&c., &c.

PATENT DRY METER.



FACTORY: DIANA PLACE, FITZROY SQUARE. OFFICE: 406, EUSTON ROAD, LONDON,
Eight Doors from Factory.

Attempts having been made to construct Self-Supplying Apparatus to Wet Gas-Meters upon the Bird Fountain principle,—which, although unerring to supply water in the open atmosphere, has not wholly succeeded so as to be relied upon when enclosed in a Gas-tight Meter Case,—N. DEFRIES begs leave most respectfully to acquaint Gas Companies, and the Public in general, that he has constructed his PATENT WET GAS-METER upon a method entirely different, being founded on the well-known principle of the self-acting supply of the Oil Lamp, which has never been applied for the adjustment of the Meter Water-Line before, and which, by the admission of external air to a chamber sealed from Gas, will never fail to faithfully perform its required function. They are of the very best materials and workmanship, will stand more pressure than is required as the test for soundness by the New Act, are guaranteed to prevent surreptitious burning without detection, and will be kept in repair free of charge for seven years.

N. DEFRIES'S CELEBRATED DRY METERS,

of which more than 80,000 are in use in Palaces, Churches, Chapels, Royal Dockyards, Club Houses, Public Offices, and other Buildings throughout the Empire and Continent, which have done so much in checking surreptitious burning, and simplified the fitting up of Gas.

To remove any doubt of accuracy of measurement his Meter for 1500 lights, in use upwards of ten years at the Royal Italian Opera, until that Building was destroyed by Fire, was long afterwards dug out of the burnt ruins, then tested by the Chartered Gas Company in the presence of George Lowe, Esq., F.R.S., and other Chief Officers, and found inflexibly correct. Also, on the 9th of June, 1858, at the Western Gas-Works, his Meter for 150 lights, after considerable use, was doubted, and subjected to the most variable tests—from the full lighting to a single Jet—and in each case, as in other instances, accuracy was finely indicated.

As to durability, his two large Meters at the Thames Tunnel have been in use night and day for upwards of twelve years—one continuation of dark hours—subjected to the wear and tear of seventy-five years as compared with the ordinary business hours of using Gas above ground.

LORD REDESDALE'S SALE OF GAS BILL.

All Meters constructed by N. DEFRIES are guaranteed to pass the Provisions of the Standard.

No alteration has been necessary in the Meters he continues to supply to the Chartered, Imperial, City of London, Equitable, and other large Companies, his accustomed range of 1 per cent. over and under meeting all the desired requirements; whereas, by the New Act, a greater departure from accuracy—viz., 2 per cent. fast to 3 per cent. slow—is permitted.

MESSRS.

CROLL, RAIT, AND CO.,

Manufacturers of Croll's Patent Improved

DRY GAS-METER,

Are prepared to supply their Meters duly stamped, under the authority of the Sale of Gas Act, 22nd and 23rd Vic., Cap. 66.

Fees for Stamping charged on Invoice.

FACTORY:

CANAL BRIDGE, KINGSLAND ROAD, LONDON, N.E.

ALEXANDER WRIGHT,

55 and 55A, MILLBANK STREET, WESTMINSTER, S.W.,

MANUFACTURER OF

CONSUMERS' COMPENSATING & NON-COMPENSATING WET GAS-METERS,

Of the best material and workmanship, carefully adjusted to meet the requirements of the SALES OF GAS ACT.

STATION-METERS & GOVERNORS,

WRIGHT'S REGISTERING PRESSURE-GAUGE, EXHAUSTER REGISTER, & REGULATOR;

STANDARD TEST GASHOLDERS;

Consumers' Governors; Inspectors' Pocket, King's, and all other kinds of Pressure-Gauges; Thermometers for Condensers, Pressure Registers, &c., &c.

EXPERIMENTAL TESTING APPARATUS,

Employed by the best experimenters in this country and on the continent, and by the Gas Testers in the London districts.

PHOTOMETERS, SPECIFIC GRAVITY APPARATUS, BI-SULPHURET OF CARBON TEST, THOMPSON'S BROMINE AND HEATING POWER OF FUEL TESTS, IMPROVED ALKALIMETER, EXPERIMENTAL METERS AND GOVERNORS, MINUTE CLOCKS, &c., &c.

"Analysis of Gas for Practical Men," by A. WRIGHT, M. Inst. C.E., post-free for 13 Stamps. PRICE-LISTS ON APPLICATION.

JAMES MEACOCK,

PATENT DRY AND WET GAS-METER MANUFACTURER,

7, SNOW HILL, AND 16, WEST STREET, LONDON.

ESTABLISHED 1836.

J. M. invites attention to his Improvements in EXPERIMENTAL WET GAS-METERS, by which he renders impossible any Leakage from the Stuffing-Box.

These METERS are GUARANTEED to meet all the Requirements of the SALE OF GAS ACT

GOVERNORS, STATION-METERS, PHOTOMETERS,

EXPERIMENTAL TESTING GASHOLDERS, HIGH-PRESSURE GAUGES,

AND ALL APPARATUS IN USE AT THE GAS MANUFACTORY.

D. HULETT and CO., 55 and 56, HIGH HOLBORN, LONDON,

PATENTEES and MANUFACTURERS of the ONLY GOOD MERCURIAL GAS REGULATOR,

invite the attention of Gas Companies and the Trade generally to their Improved GAS-METERS, which they warrant equal to any in Quality, Workmanship, and Simplicity of Construction, and the only Meters from which Gas cannot be obtained without being duly registered.

MANUFACTURERS OF

GAS CHANDELIERS, GLASS LUSTRES, HALL LANTERNS, VESTIBULES, BRACKETS, PENDANTS;

DOUBLE CONE, ALBERT, SHADOWLESS, & EVERY DESCRIPTION OF BURNER, UNION JETS, BATSWINGS, ETC.;

IMPROVED FULL-WAY CARTER'S VALVES (much approved of);

GAS-STOVES, and every article connected with Gas Apparatus.

CAST & WROUGHT-IRON PIPE BLACK & GALVANIZED. COPPER. TIN, BRASS, & COMPOSITION TUBING.

D. HULETT'S IMPROVED SERVICE CLEANSER

for clearing out Mains, Services, and Interior Fittings—60s. net.

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